JUNIOR MECHANICS AND

# MODEL AIRPLANE NEWS

15 CENTS

APRI
1930

*In this Issue*

## LINDBERGH'S
## NEW LOCKHEED "DOG STAR"
(Full size plans for a perfect model)

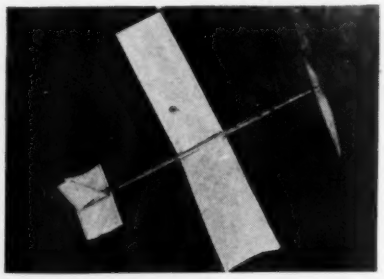
## NAVY FIGHTER
Fast Climber, A-1 Flye

GLIDER FLYING *for the* BEGINNE
By O. H. KNEEN
All you want to know about sail flyin

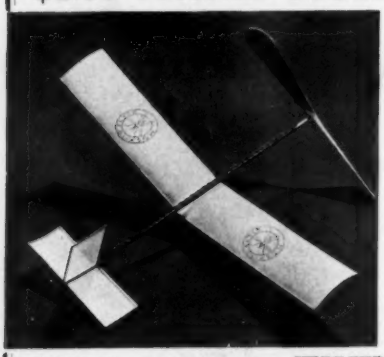
# MOSKITO FLIER SETS THE PACE

## 50c POSTPAID BABY R.O.G.

The sensation of the Baltimore Aviation Show. This is the Official Kits of the American Sky Cadets. To the left an actual unretouched photo of the Baby R.O.G. which made duration flight of 4 mins. in the air before thousands of people. This is a sure contest winner. You must have one for your hangar of models. Cannot be beaten at twice the price. Get it today.



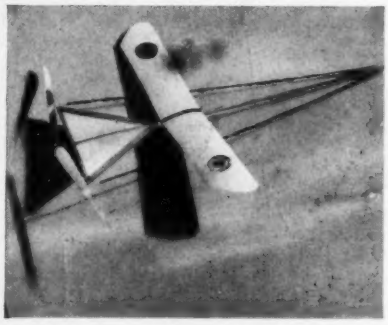
## $1.00 POSTPAID MOSKITO FLIER



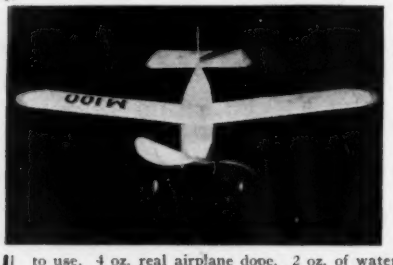
The big brother of the famous Baby R.O.G. Special slow revolving propeller keeps it in air 5 minutes or more.
Kit absolutely complete with full sized layout and all details. Free extra propeller. Wire fittings all bent and ready to use Aero dope and aero cement. Balsa construction throughout. Can be adjusted for height or distance. Be the first in your neighborhood to get this sensational Flier. Rudder adjustable. Can be flown in small room. You'll never be satisfied till you own a Moskito Flier—Why wait?

## $3.00 POSTPAID TWIN PUSHER

Absolutely the slowest flying model obtainable. Flies 10 minutes and many hundred feet. All balsa construction. Wing spread 30". Weight 2¼ oz.—can be lightened. You can be as sure the Moskito Twin Pusher will outfly any other model as you are that there will be a flame when you strike a match.
Most complete kit on market. 2 blank balsa propellers—right and left—sent extra with kit. Free winder, dope, cement. Wire fitting all formed. Wing ribs cut to fit and wing curve proven. You'll get a $100 worth of fun out of this $3.00 model. Easy and simple to construct with full size layout sheet. If you want fun, this is your model.



## $3.50 POSTPAID CABIN TRANSPORT



This model has flown 1,200 ft. Wing spread, 36". Fuselage, 20". Weight, 3 oz. or less. All balsa wood construction. Flying speed only 7 miles per hour. Fuselage sides already made and all wood cut to size. You'll find it easy and thrilling to build this model. 12" carved propeller. Extra blank free with carving instruction sheet. New type landing gear, shock absorbing and unbreakable. All fittings made and ready to use. 4 oz. real airplane dope. 2 oz. of waterproof cement which dries white. Ribs cut and shaped ready to use, with wing curve tried and proven. An unbeatable bargain at $3.50 postpaid.

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## Read these Startling Prices

Because Moskito deals in tremendous volume, we can offer rockbottom prices on all model supplies. We specialize in prompt service. All items guaranteed perfect, hand inspected and tested. Save this page—these prices are permanent.

*All prices postpaid.*

*Give us a trial order and get real satisfaction.*

| | | Price |
|---|---|---|
| Large Tubes Aero Cement | | .15 each |
| 2 oz. bottles Aero Dope | | .20 " |
| 2 oz. bottles thinner | | .20 " |
| Cement in Cans—2 oz. | | .25 " |
| Small tubes cement | | .10 " |
| Bottles Banana Oil with brush | | .10 " |
| Sheets Japanese Tissue Paper | 21 x 25" | .05 " |
| Sheets Japanese Bamboo Paper | 24 x 36" | .14 " |
| Sheets Cellophane | 12 x 24" | .12 " |
| Sheets Three Ply Veneer | 12 x 24" | .30 " |
| Following strips of rubber in lengths of 25 and 100 feet— | | |
| 1/16 x 1/32" | | .01 per foot |
| 1/16 x 1/16" | | .01 " " |
| 1/8 x 1/8" | | .02 " " |
| 1/8" flat | | .01 " " |
| 3/16" flat | | .01½ " |
| Pcs. No. 60 Drill Wire 36" long | | .10 each |
| Piano Wire, 10 ft. rolls | | .01 per foot |
| Spools of Steel Hair Wire | | .10 each |
| Pcs. Flat Bamboo each 15" long | | .02 " |
| Winders | | .30 " |
| Packages Aluminum Powder | | .10 " |
| Fittings—Envelopes containing the following—1 propeller hanger, 1 shaft, 1 small wing clip, 1 large wing clip, 1 wire can, 1 rear hook, two washers, two bearings | | .10 per pkg. |
| Washers | | .10 each |
| Bearings | | .10 " |
| Propeller Blocks (Shaped) | 6" long | .08 " |
| " " " | 7" " | .10 " |
| " " " | 8" " | .12 " |
| " " " | 9" " | .14 " |
| " " " | 10" " | .16 " |
| " " " | 11" " | .18 " |
| " " " | 12" " | .20 " |
| " " " | 16" " | .28 " |
| Bentwood Propellers | 6" long | .12 " |
| " " | 7" " | .14 " |
| " " | 8" " | .16 " |
| " " | 9" " | .18 " |
| " " | 10" " | .20 " |
| " " | 11" " | .22 " |
| " " | 12" " | .24 " |
| " " | 16" " | .32 " |
| Balsa Wing Rib Sets | | .35 per set |
| Balsa Entering Edge Sticks | | .10 each |
| Small Wheels | | .02 " |
| Medium Wheels | | .03 " |
| Large Wheels | | .05 " |

# Fellows I Have Trained Will Tell You That You, Too, Can Cash In On

# ELECTRICITY

## Not By Correspondence

"First I enrolled with a School teaching Electricity by correspondence. I tried to work out several lessons, but quit when I saw your ad. telling how you taught Electricity by actual work. I didn't have much money when I went to Coyne, but through your Employment Department I was able to work for my room and board. Three days after graduating you got me a good job with a Battery and Electric Shop, and a year later I bought a Shop of my own. I now have a $1300 car and a thriving business—all paid for."

George W. Stoneback, Illinois

## Lands a Job at $8,000 a Year

"Before going to Coyne, I was an ordinary mechanic. Now I make $300.00 a month, and am accepting a new position the first of the year as Chief Electrician at $8,000 a year. Any man who works for me will have to be a Coyne graduate."

Stanley Zurawski, Michigan.

## From $20.00 a Week to $100.00 a Week

"Before going to Coyne, I had worked in a garage for five years at $20.00 a week. I had no advanced education and didn't know a volt from an ampere. Yet I graduated in three months with a grade of 98%. Since I left Coyne, I have jumped from $20.00 to $100.00 a week, and am still going strong. I owe all my success to the practical training I got in the Coyne Shops."

Harry A. Ward, Iowa.

"I knew nothing about Electricity, before I went to Coyne," says Nolan H. McCleary. "I had no advanced education and so little money that I could never have stayed at school, if Mr. Lewis hadn't gotten me a part-time job. Yet I finished the course in twelve weeks, and the School immediately placed me in a fine electrical job. Now I am Chicago District Manager of the largest electrical concern of its kind in the world, making more money than I ever dreamed of making before I went to Coyne. I am convinced that there is but ONE RIGHT WAY to learn electricity and that

NOLAN H. McCLEARY
*Chicago District Manager, Beardsley-Wolcott Co.*

is the way of the Coyne School—BY DOING ACTUAL ELECTRICAL WORK YOURSELF UNDER EXPERT INSTRUCTORS, ON FULL-SIZE, RUNNING ELECTRICAL MACHINERY AND EQUIPMENT."

For thirty years Coyne has been training men for responsible, Big-Pay electrical jobs—NOT BY BOOKS OR CORRESPONDENCE, but by an amazing way to teach that makes you a practical Expert in 90 days. You need no advanced education or previous experience. I don't care if you don't know an armature from a generator; if you're sixteen years old or forty. IT MAKES NO DIFFERENCE! I will prepare YOU for a fascinating, Big-Pay electrical job in twelve weeks time. I will allow you your railroad fare to Chicago—help you get part-time work while at School—and give you every assistance in locating just the job you want when you graduate.

## Says You Can Make $60.00 to $200.00 a Week

"Before going to Coyne, I made thirty cents an hour. I borrowed the money for my tuition and you got me a part time job that took care of my expenses. I graduated in twelve weeks, returned home and started doing wiring on contract. In a year's time, I had paid for my schooling, bought a car and had a nice shop of my own. In your catalog you say a fellow can make $60.00 to $5.00.00 a week. I have done better. In July I made $150.00 to $200.00 a week, and I have made as high as $75.00 a day."

Joseph F. Hartley, West Virginia.

## His Advice—"Go To Coyne"

"Some fellows try to learn Electricity by just working at it. Others send away for correspondence courses in it. But my advice to anyone who really wants to learn Electricity is TO GO TO COYNE. They have all the electrical equipment right in the school that you will ever see in the field. NO PICTURES OR USELESS THEORY. They show you just how to do everything you will have to do on the job."

R. M. Ayers, Louisiana.

## Nothing Compares to Practical Training

"Before going to Coyne, I took a correspondence course in Electricity, but it was too deep for me and I lost interest. Then I got your catalog, saw how you let the student actually work on electrical equipment, and decided to go to Coyne. At that time I was only making $9.00 a week. Now I make $68.00 a week straight time, have a Hudson car and own my home—where before I could hardly pay rent."

D. G. Emerson, Michigan.

## LET ME SEND YOU THE SAME BIG FREE BOOK THAT BROUGHT SUCCESS AND BIG PAY TO ALL THESE MEN—SIMPLY MAIL THE COUPON

Find out how QUICKLY and EASILY you can land a Big-Pay Electrical Job! IT COSTS NOTHING TO INVESTIGATE! Just mail the coupon and let me send YOU the same Big Free Book that started all these other fellows on the road to success. This doesn't cost you a cent, nor does it obligate you in any way. GET THE FACTS. Mail the coupon—NOW!

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JUNIOR MECHANICS
and
# MODEL AIRPLANE NEWS

## CONTENTS

**Vol. II** **April, 1930** **No. 4**


| | | Page |
|---|---|---|
| WINGS ON A BATTLESHIP<br>*A Flying Ensign's Vindication in a Storm at Sea* | Francis X. Farrell | 10 |
| LEARNING TO FLY A GLIDER<br>*Up-to-the-Minute Data on Sail Flying* | O. H. Kneen | 14 |
| PICTORIAL SECTION | | 18 |
| HOW TO BUILD LINDBERGH'S "DOG STAR"<br>*A Flying Model of His Specially Built Lockheed* | | 21 |
| THE AVENGER FROM THE SKIES<br>*Dan Escapes to the Hills to Fight for His Life* | Laurence Donovan | 30 |
| MODELS AS SCIENTIFIC AID TO AVIATION<br>*An Absorbing History of Model Building* | Prof. T. N. de Bobrovsky | 34 |
| A TRIM, FAST-CLIMBING NAVY FIGHTER<br>*Plans for A Good Flyer Fitted with Attractive Devices* | Hi Sibley | 35 |
| A COURSE IN AIRPLANE DESIGNING<br>*Part Five* | Ken Sinclair | 40 |
| THE AMERICAN SKY CADETS<br>*Reports on Activities in Various Cities* | | 41 |
| HINTS TO MODEL MAKERS<br>*More Prize Winning Suggestions from Readers* | | 46 |
| HOW TO BUILD A 16" MODEL SPEED BOAT<br>*A Snappy Racer Easily Built and Launched* | J. B. Wiebe | 47 |
| MACFADDEN AVIATION ADVISORY BOARD<br>*(Question and Answer Department)* | | 50 |


## In Our Next Issue

HOW TO BUILD A DOUGLAS MAIL PLANE

The oustanding model of the Aviation Show!

—o—

FULL SIZE PLANS, TOO, FOR A MODEL OF THE VOUGHT "CORSAIR"

Another excellent model to add to your collection

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—o—

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By JACK D'ARCY

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—o—

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By PROF. DE BOBROVSKY

More interesting and instructive information on models and model making

—o—

HERE AT LAST—AND—WORTH WAITING FOR!

Complete plans for making a model of the famous Graf "Zeppelin"

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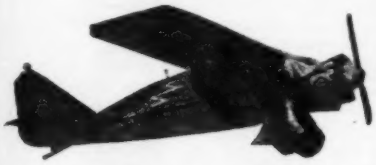
*Prize Winner at 1930 N. Y. Aviation Show Contest*

MODEL Kit—Complete with colored dopes and full sized blueprints .....$6.00

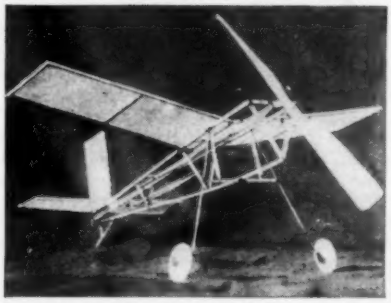


23" BELLANCA C. H. SOLID SCALE MODEL Kit—Complete with colored dopes and full-sized construction blueprints .....$2.50

24" U. S. ARMY FALCON Observation and Attack Biplane Flying Scale Model Kit—Complete with colored dopes and full-sized blueprints .....$3.50

**22" FLYING SCALE MODEL OF COL. LINDBERGH'S Mystery Lockheed SIRUS;** or otherwise called the "DOG STAR". The entire model is constructed of Balsa Wood, excepting for the light celluloid wheels and metal fittings. The colors accompanying this kit lend the realistic touch to the finished model; which when completed in accordance to the blueprints that go with the kit weighs from two to three ounces. This model is a wonderful flyer. COMPLETE KIT, ONLY.....$3.50

**New York's Sensation, "THE COMET"**



BABY in size; but GIANT in performance. This indoor commercial model is of 11" wingspan and is guaranteed to RISE OFF THE ground. Can be converted into a seaplane if desired. Kit complete with full-sized detailed blueprints and in boxed container. ONLY .....75c

### Model Airplane Blueprints

| Name and Type | Sheets to Set | Price |
|---|---|---|
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| Baby R.O.G. | 1 | .15 |
| Indoor and Outdoor Tractor | 1 | .15 |
| Windjammer No. 3 Tractor | 1 | .15 |
| "Comet" Indoor Commercial | 1 | .20 |
| Seaplane Flying Stick | 1 | .25 |
| K-G Twin-Speedster | 1 | .35 |
| "Giant Comet" Outdoor Commercial | 1 | .40 |
| Col. Lindbergh's "Mystery" Ship | 1 | .50 |
| U. S. Navy Vought "Corsair" | 1 | .50 |
| A.A.C. Champion Twin-Pusher | 1 | .50 |
| Curtiss "Baby" Falcon | 1 | .50 |
| Curtiss Army "Hawk" | 1 | .50 |
| Junkers Low Wing Monoplane | 1 | .50 |
| Swedish K-47 Combat Monoplane | 1 | .75 |
| French Bernard Pursuit | 2 | 1.00 |
| U. S. Army Curtiss Falcon | 3 | 1.00 |
| Curtiss "Robin" Monoplane | 2 | 1.00 |
| Keystone-Loening Amphibian | 3 | 1 50 |
| SOLID SCALE MODELS | | |
| Bellanca CH Monoplane | 1 | .50 |
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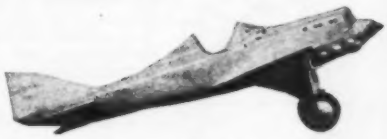
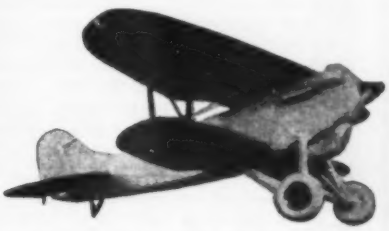


27" FRENCH BERNARD PURSUIT SHIP Kit—a low-winged flying scale model. Complete with colored dopes and full-sized blueprints .....$3.50



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By Mail

## An Opportunity for Everyone to Win Something. Individual Awards Total 165

### Honor Certificates to Qualifying Entries

Now comes your opportunity to win $100 in gold, a handsome silver aviation trophy 18 inches high, and nationwide fame as a Champion Model builder. Never before have you had such a big number of awards to work for. Never before has it been so easy for model builders to step into the limelight and win recognition for their work. Hundreds of dollars will be distributed to those who enter. And the contest is so planned that you can win as many as 5 different awards!

### You Need Not Be An Expert Model Builder

You do not have to be an exceptional model builder. You do not need a great amount of skill. You do not need a large amount of experience. In planning this national contest we wanted to reward the steady, consistent builder rather than the freak flight record which others cannot duplicate easily. The builder who is careful and patient with his work is the one who has the bigger opportunity of winning the grand Gold Prize of $100 and the 18-inch Silver Aviation trophy—valued at $50—suitably engraved with his name, and national recognition for his work. Just as the Ford Reliability Tour each year rewards the winning airplane on a basis of all-around performance, so does the Champion contest recognize the consistent work of a model builder. Hundreds of dollars are going to be distributed and you will want a prize. Honor certificates go to all qualifying entries.

### Win a Pilots Rating

Upon enrolling you receive a card giving you cadet rating. You are going to be thoroughly trained in model building and the fundamentals of flying. When your first model is ready and you have sent in a report, you will be licensed as a Champion PILOT, ready for your second test. From pilot you advance to Flight Commander, Squadron Commander and the winner of the Grand Prize for the year will be known as Champion's Ace. Talk about fun! Talk about thrills! There is nothing in the model building hobby equal to this contest. All Champion models are new scale-type reproductions of real airplanes, and even if you don't want to enter the contest, you will have loads of fun building and flying these realistic models. Look over the models listed and get your order in now. Complete contest details in each kit.

## $1000 In Prizes For Model Builders

### HOW PRIZES WILL BE AWARDED

Here is how the $1000 Champion Contest is handled. Models are divided into 10 classifications—1—Scale-type Monoplanes; 2—Scale-type Biplanes; 3—Scale-type multi-engined models; 4—Indoor Scientific models; 5—Outdoor Scientific models; 6—Novelty models; 7—Flying boats; 8—Racing models; 9—Zeppelins; 10—Gliders. You select any class you wish to enter (all classes are represented in Champion's complete catalog). With each kit is enclosed an entry blank. When your record is ready, send it with picture of model to contest dept. You have April, May and June in which to compete in the first contest period. Upon qualifying you receive pilot's rating and then you can go ahead for flight commander rating and second contest period. There are four periods of 3 months each with prizes for each period, each classification and the grand prizes. Each classification in each period will be awarded 1st prize—$10; 2nd—$5; 3d—$3; 4th—$2, or a total of $200 for each period. In addition to winning classification and period prizes, you can participate in the $200 Grand Prizes and Trophy awards. Credits earned in each period and in each classification are added together to determine the Ace for 1931.

**Watch for Picture Trophy in May Junior Mechanics and Model Airplane News**

### RULES OF THE CONTEST

1. Only Champion Construction kits are eligible for this contest.
2. Entire work on model must be completed by contestant. Only formed metal or celluloid parts will be permitted.
3. Points awarded on basis workmanship and flight record. Every second duration receives 10 points. Workmanship based on scale of 100. Flight points added to workmanship points to determine rating.
4. Photograph must accompany entry to earn workmanship credits.
5. Builders can enter as many classifications as they choose but only one entry in a classification in a period will be consdiered.
6. Entries for period prizes must be signed by responsible flight witness who timed flight. To be considered for Grand Prize awards, entries must be sworn before a notary.
7. Judges reserve right to investigate any entry and to disqualify same if evidence shows report not properly made. The judge's decision shall be final.
8. No period prizes will be awarded in a classification if less than 10 entries are received. When this occurs, entries will be filed for next period and judged with entries coming in then. There will be no awards unless 10 entries compete. Credits will be awarded entries, however, which will apply towards the Grand Prize awards just the same. Duplicate prizes will be paid in each contest to each tieing contestant.

**Mail Coupon (Page 8) With 10c for Catalog, Enrollment Card, Cadet Rating and Flying Button**

# ORDER Your Contest Construction Kit NOW!

**The Earlier You Start Working the Better Your Opportunity to Win the Grand Prize Trophy and $100 in Gold.**

$1000 IN PRIZES - 165 AWARDS

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

# Famous Folding Wing Fairchild 71

*New Kits Include Balsa Prop, Wing Ribs, Framing Readicut*

Champion
FLYING MODEL AIRPLANES

3 MODELS IN 1

LAND PLANE (Wheels)

SEA PLANE (Pontoons)

SNOW PLANE (Skis)

## Featherweight Construction Means Flights of Hundreds of Feet

Here's a Class 1 Contest Model. The most popular Champion Model we have ever advertised. There will be $20 in prizes awarded every three months to builders of this model with entry credits to be added together to determine Grand Prize winner. It is a 2-foot realistic model of the Fairchild 71—with FOLDING WINGS, workable doors, cellophane windows, pontoons, skis and wheels, just like the original, to fly R.O.G., R.O.W. or R.O.S. (rise off snow). Landing equipment interchangeable to suit flying conditions. Wings adjustable as well as folding, so centers of pressure and gravity coincide and assure long, stable flights. FULL SIZE BLUEPRINTS prepared by professional draftsman. Material furnished in contest form. Directions describe and comment on each construction step. Eye-arresting model with its neat lines, orange wing and black-trimmed fuselage. Those who have received this model praise the quality of materials furnished and its beautiful appearance. Wing span 24". Chord 3⅝". Length 17½". Height 6". Weight ¾ oz. Champion's new rubber motor, balsa, glue, dope, bamboo, fittings, finished balsa prop and blank for carving contest prop, wing ribs, framing readicut, blueprints, directions, complete kit in strong mailing tube for safe delivery. A $5 value sold direct to you postpaid Canada $2.20. U. S. postpaid .

**U. S. NAVY Specification Airplane Balsa Furnished in All Champion Kits**

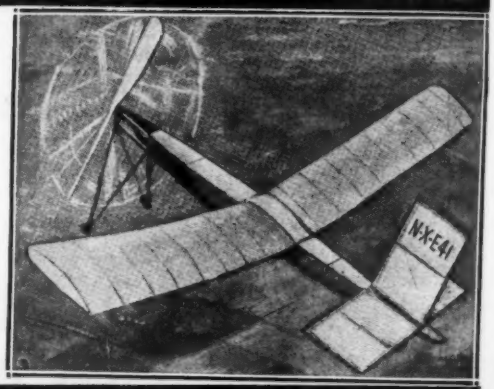
$2

FULL SIZE PROFESSIONAL BLUEPRINTS FURNISHED WITH KITS

## WIN Double Prize With This Sensational Flyer

4-FOOT high flying record-maker that is offered at the lowest price ever made on a model of this big size. Easy to build. Easy to fly. On our own proving ground the N-X-E41 left ground after 2-foot run and grabbed altitude like a Curtiss Tanager. This type has 41-minute record made by gaining 500 feet or more altitude, then duration by flat glide and wind currents. Special extra prize for best flight record of $10 reported by May 1, 1930, as well as $1,000 Contest awards. This is a Class 5 model. High lift wing curve, 20-ft. Champion's new rubber, turning a 16-in. balsa prop. Full size blueprints prepared by professional draftsman. The N-X-E41 is a real prize-winning model. Complete outfit in mailing tube postpaid Canada $3.30. U. S. postpaid.....

$3

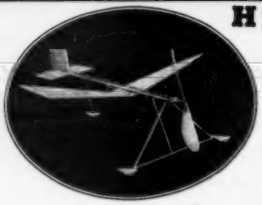



"CHAMPION" MODELS ARE FLOWN THE WORLD AROUND

**All-Silver Lustre-Finish Spirit of St. Louis**

Contest Class 1 model. 1½-ft. FLYING cabin reproduction of Lindbergh's cross-Atlantic monoplane. Finished all over in BRILLIANT SILVER LUSTRE. Nothing like it on market. 90-second flight reported by New York purchaser. Dozens of others have qualified for Merit Certificates. Realistic reproduction, even to "Lone Eagle" at controls. Tough 18-in. Mitschfibre wing and 12-in. fuselage withstand any crash. Weight 1½ oz. Simple A-B-C assembling outfit anyone can put together successfully, as all parts numbered. No tools needed. 6-in. fibre prop, readicut wood struts. Clark "Y" wing ribs, 1½ in. disc wheels, detail drawings, pictures, full directions—all COMPLETE in mailing tube; postpaid Canada $1.20. U. S. postpaid.....

$1



**Hydroplane**

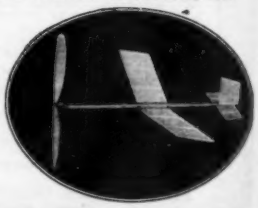
Class 4 Contest scientific type model equipped with light pontoons. Big sport flying it from creek, river, lake or tank. Takes off from water, flies like a real ship, and lights on water again. Complete Canada $1.20. U. S. postaid

$1

**Indoor Record Holder**

Another Class 4 Contest model. The type that has flown over 40( seconds at the Detroit meets, winning prizes and awards running into hundreds of dollars. Special balsa with light fittings. Blueprint and directions. Canada postpaid $1.20. U. S. postpaid....

$1



$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES - $1000 IN PRIZES

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

# Lindbergh's New Lockheed
# The "Dog Star"
# The Hottest Plane for 1930

*Scaled Directly from Engineering Drawings Furnished by the Manufacturers*

De Luxe Silk Covered Construction $10

Tissue Covered Construction Kit $5

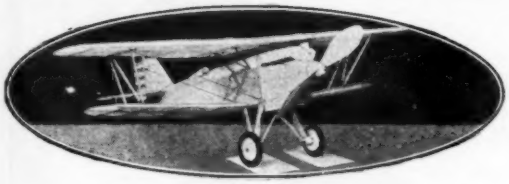
2-ft. Kit complete $2

Be the First to Have One

This Class 1 Contest model will be the most popular plane for 1930. It has been scaled direct from plans furnished by the manufacturers. In the Deluxe kit the model is covered with featherweight airplane silk. Celluloid N.A.C.A. Cowling, pants and landing gear are furnished. In the other kits tissue is used for covering. FULL SIZE BLUEPRINTS are included. The finished model has the black fuselage, orange-red wings and gold strip of the original. Its streamlined, neat appearance will make it the envy of everyone who sees your completed model. Using Champion's featherweight construction methods, you should obtain plenty of duration flights. $10 and $5 kits have 4-foot wing span. Insignia furnished includes "N-R-211" and Lockheed trademark. Every important detail reproduced, so that you have as near a scale model as it is possible to make that will have outstanding flying characteristics. The streamlined pants give it a racy appearance. The cowling and rounded, cigar-shaped fuselage heighten this effect. Champion's new rubber motor, U. S. Navy specification balsa, metal parts formed, blueprints, directions, everything complete. Deluxe kit $10., Tissue-covered kit $5., 2-ft. tissue covered model $2. All postpaid U. S. Canadian orders and west of Denver, Col., add 50c for postage.

**Celluloid Pants Landing Strut and N.A.C.A. Cowling**

USE COUPON ON NEXT PAGE TO ORDER THESE MODELS

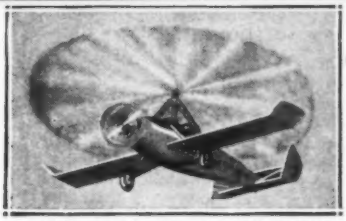


## U. S. Army Curtiss Hawk

Contest Class 2 model. Beautiful colored scale model you will be proud to own. Olive drab and yellow dopes furnished same as used on original Hawks, except thinned down for model use. Cockpit, streamlined headrest, imitation exhausts, synchronized machine guns, staggered, adjustable wings, army insignia in colors, detailed blueprints, all complete.

To be covered with superfine Jap tissue, Canada $3.30 postpaid. U. S. postpaid..... $3

To be covered with Jap silk, thistledown weight, Canada and west of Denver, Colo., $5.50. U. S. postpaid..... $5

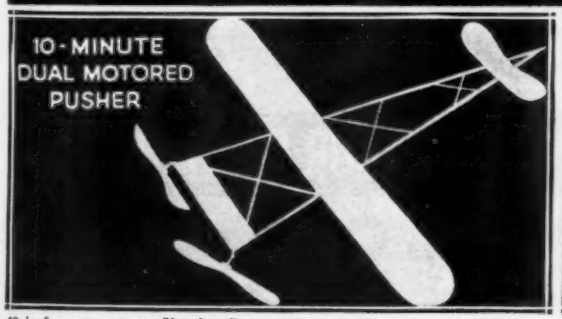


$2

## New Autogiro Model that Flies

Here's a new thrill in this Contest Class 6 Flying AUTOGIRO Model. Champion is the first to introduce such a model. Autogiro principal fully carried out, so that this is a most educational model to build. A great type with which to experiment. Fuselage and short wing built from balsa and tissue covered same as any other model. Front prop rubber powered. Fanning windmills revolve by autogiro principal, fully explained in directions and blueprints. Order one today. Canada postpaid $2.20. U. S. postpaid..... $2

ALL KITS GUARANTEED TO SATISFY--OR MONEY REFUNDED




40-inch contest type flier for Contest Class 5. Uses Champion's endurance rubber, special high lift wing curves and refined construction details. Featherweight balsa produces model that floats on air with slow turning props which spiral the plane to great heights and long flights. Well packed in strong mailing tube, complete with all materials. Full size blue prints, directions, postpaid Canada $3.30. U. S. postpaid.... $3

Another Class 5 model, having remarkable duration flight qualities. Like all Champion kits, comes complete with all necessary materials, full size blueprints, Champion's rubber motor, U. S. Navy specification balsa and formed metal fittings. A hydroplane model always fascinates by its performance over water. You will get hours of fun out of this job. Postpaid Canada $3.30. U. S. postpaid..... $3

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES - $1000 IN PRIZES

IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

# Biggest Model Airplane Contest Ever Held By Mail

## New Rubber Motor

**10% MORE POWER**
**10% MORE WEAR**
**10% MORE TURNS**
**10% LONGER LIFE**

After months of experimental work, Champion has now a new type of rubber thread, giving 10 percent more power, more turns, more wear. It is less affected by light than commercial rubber thread. It is vastly superior to what you have been using yet the price is the same as the ordinary kind. If you don't think it better than any other you have ever tried, send it back and receive your money in return. Unconditionally guaranteed. 25 feet 1-8"—25c. 125 feet 1-8"—$1. 25 feet 3-16"—35c. 80 feet 3-16"—$1. Add 10c for postage.

**CARVED STANDARD PITCH BALSA PROPS**

Here are 10-inch Standard Pitch Balsa props, that will save you two-thirds the weight of a prop made from any other wood. Will make a big difference in your model's performance..... **$1**

**U. S. NAVY SPECIFICATION**

## BALSA WOOD

Champion handles only one grade of balsa wood—U. S. Navy Specification. It is free from blemishes and is straight grained. We have received letter after letter from customers commenting on the high quality balsa we send them. All standard sizes for model work are stocked and planks are priced at 50c a board foot. This wood is absolutely necessary if you wish to make duration with your models. Send us your requirements and we will be glad to quote lowest prices. Catalog lists prices on all standard sizes.

## Airplane Dope

Here is a high grade airplane dope that is just the thing for model work. Supplied with Champion kits it has proven to be without an equal for supplying an airtight, smooth, drumhead surface to your model. 2-oz. 35c. Postage extra, when ordered alone, 10c.

## Colorless Glue

Model builders tell us we have the strongest white glue they have ever used. Dries fast and hard. Colorless and does not detract from model's appearance. Tube, 15c. Postage extra 10c when ordered alone.

## Superfine Jap Silk Tissue

A new superfine Jap silk tissue finest quality obtainable. Tough and very light. Size of sheet 18 x 24. Price each 20c, 2c postage extra. Regular model supply house grade silk tissue 21 x 31 sheets 15c each, 2c postage extra.

A superfine tissue of unusual thinness. Harder to handle than silk tissues but the very lightest covering obtainable. Price sheets 18 x 24 20c each. 2c postage extra. Try a sample sheet.

## Featherweight Jap Silk

We are offering model builders a featherweight, Jap silk which adds very little weight to their models. Comes in white and may be easily dyed any shade desired with very little trouble. Price per yard $1. Postage extra 10c.

**$1000 In Prizes For Model Builders**

*Order Your Kits Direct from This Announcement. Get Started Early to Win a Prize*

**MAIL THIS**

### Tear Out—Mail Right Away

***Be the First to Fly these New Models***

All kits and supplies guaranteed to satisfy, or for any reason within 5 days may be returned and your money refunded.

CHAMPION MODEL AIRCRAFT SUPPLY,
1077 Atlas Building, Columbus, Ohio.

Gentlemen: I Enclose $..... for which send me, right away, Model kits I have checked below:

- ☐ Fairchild Folding Wing...$2
- ☐ N-X-E41.....$3
- ☐ Indoor Hydroplane.....$1
- ☐ Indoor Record Holder...$1
- ☐ Spirit of St. Louis.....$1
- ☐ Curtiss Hawk.....$3
- ☐ Curtiss Hawk Silk Covered.....$5
- ☐ Lindbergh Lockheed Deluxe.....$10
- ☐ Lindbergh Lockheed.....$5
- ☐ Lindbergh Lockeed 2-ft..$2
- ☐ Auto Giro.....$2
- ☐ Outdoor Twin Pusher...$3
- ☐ Outdoor Hydroplane...$3
- ☐ Catalog, Contest Enrollment.....10c

Included extra for postage.....

Name.....

Address.....

City and State.....

Please write plainly.

**Guaranteed to Satisfy—Or Money Back**

## COUPON AND YOUR ORDER NOW

## 32-Page Illustrated CATALOG

Our engineer has just returned from the International Aircraft Exposition held last February in St. Louis, where he saw all the new airplanes for 1930 exhibited. The new colors, new models, new trends in design, were all noted and are incorporated in Champion's line for 1930. This 32-page catalog lists the very latest scale-type models, all to be constructed on the best aerodynamic principles. Real scientific methods of construction are employed, for Champion models are more than toys. They teach the laws of flight and give a basic education in flying. Champion does not offer any fast-flying, over-powered type models whose support in the air depends on their excessive speed. Every Champion model flies by wing lift and not an over-powered prop. Send for this catalog now.

**10c**

$1000 IN PRIZES - 165 AWARDS - HONOR CERTIFICATES

# SOMETHING DIFFERENT—AND HOW IT FLIES!

*Looks like a real plane, doesn't it? Both this and the picture below are unretouched photographs.*

The Logan Toy Works,
35 East Gay Street,
Columbus, Ohio.

Dear Sirs:

I am glad to have had a chance to see your little biplane. I have been building models for about two years but this is the most interesting little set I have had.

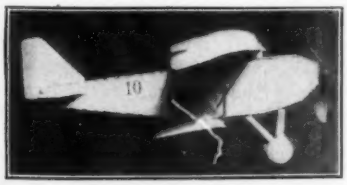
I found it very easy to build. I think your idea of simplifying construction is a good one because it will keep so many boys from wasting their time on sets that take experts to put together.

The little ship is very good-looking and flies fine. Seventy feet is all it has done yet, but I know it will do almost twice that when I get it adjusted.

Yours truly,

Jack Williams

207 Brunson St.,
North Munson, Ill.



*Something different*—a biplane instead of just another monoplane! One of the most realistic models on the market, and one of the easiest to build.

This little model of an army fighter will be the envy of every boy in your neighborhood. It has a wing span of one foot and weighs only a quarter of an ounce! It will rise off a floor or sidewalk and come down again to a perfect landing. Because of its light weight it is not apt to be damaged if it strikes a wall while being flown indoors. In bad weather you can fly it in any large room, and when flying conditions are good you can take it outdoors again. And it will really get up and *fly*—not just glide or flop around. It is guaranteed to do from sixty to one hundred feet. The duration is about twenty seconds.

In spite of the fact that this model will out-perform many costing from two to five dollars, it is remarkably easy to construct because there is no delicate, complicated, tedious framework in the wings, tail or fuselage.

The wings and tail surfaces are cut from sheets of stiff papyronoid paper, and all you have to do is cement them to the fuselage, which is made of the same material, and which is just as easy to make. Cement the sides together, fasten a few braces in place, and the job is done. An expert can have a finished model in forty minutes, while anyone should be able to do the work in an evening. Many other scale models take days or even weeks to assemble.

The frameless construction is based upon the idea used in Col. Lindbergh's wonderful new Lockheed Sirius, except that papyronoid is used instead of plywood.

The construction set includes everything needed to build the finished model:

- Wing and fuselage material
- Three-quarter inch disc wheels
- Axle
- Aluminum propeller
- Propeller shaft
- Propeller shaft bearing
- Quick-drying model cement
- Rubber band motor
- Bamboo struts
- Detailed drawings and clear directions
- Flying instructions

The set is packed in a sturdy container which prevents damage even under rough handling. And you get it all for eighty cents!

**The Logan Toy Works**

**35 East Gay Street** **Columbus, Ohio**

*(This set is suitable for boys of 14 or over, or younger boys with model-building experience)*

**ORDER YOUR SET TODAY!**

Enclose 80c with your name and address and your set will be mailed to you, postpaid in the United States, Canada and Mexico. We can not use stamps or bill C. O. D's. Check or money order safer than coin. If you are not satisfied with your model after your have constructed it we will refund your money. Use this coupon if you care to.

The LOGAN TOY WORKS,
35 East Gay Street,
Columbus, Ohio.

Gentlemen:
For the enclosed 80c send me your Army Biplane sets.

Name.....

Street.....

City.....

State.....

# WINGS on a

## By Francis X. Farrell

"RADIOGRAM, sir!"

With a smart salute, the radio operator tendered the message to Captain R. Hanlin Russell, Commander of the *U. S. S. Saratoga*. Without a word and only a curt acknowledgement of the salute, Captain Russell took the message and turned on his heel.

"Sparks" was dismissed. He knew it and it didn't take him long to find the companionway leading down from the flying-bridge. No one, if he could help it, kept himself in line with the baleful glare of the eye of Captain Russell—of the eye of "Old Tradition" Russell as he was referred to throughout the fleet.

Captain Russell opened the official yellow envelope and, as his salty eye took in the brief message, his dark brows contracted in a ferocious frown. He crumpled the message into a hard ball in the palm of his hand, emitted a sharp, picturesque sea oath from between clenched teeth and pounded the width of his bridge.

"By the holy anchor-chain." Again the expletive crackled from his lips. "What's this man's navy coming to . . . what. . . ." He did not finish the spoken thought, for at that moment Commander Mattson stepped from the chart-room onto the bridge.

"Mr. Mattson." "Old Tradition's" voice was sharp and insistent. Mattson turned and approached his superior. They saluted.

"Yes, sir?"

Without another word Captain Russell held forth his clenched hand and dropped the yellow ball of paper into Mattson's open palm.

"Here, read this."

Mattson unrolled the message and after reading it, returned the paper to Captain Russell without a word.

"Well?" "Old Tradition" roared. "Haven't you anything to say?"

"Nothing except that it's orders, sir."

"Orders be dashed! What I want to know is what's this man's navy coming to. Airships! Bah! Airplanes! Bosh! What good is a toy like that aboard a man o' war?"

He paused in his diatribe, giving his commander a chance to reply, but from out his wisdom Mattson held his peace. Captain Russell continued.

"Absolutely nothing, I say! Before we know it they'll take away our guns—make us nursemaid to a pack of silly flying machines."

MATTSON listened in silence. He knew from long experience the futility of trying to check his superior's flow of ire when he was on his favorite subject—the neglect of the navy or the tendency to undervalue the navy's importance in the scheme of national defense and offense.

The *Saratoga*, with the rest of the Pacific fleet, was one day out from San Diego for deep-sea maneuvers. Now, just as the salty tang of sea-spray was washing away the choking dust of city streets from Captain Russell's throat, he had orders to return to San Diego, there to put up at the navy yard to take on another and untried airman and his airplane.

"Making us a nursery for kid aviators! Bah!" He boomed at Mattson, and again started pounding the width of the bridge.

# BATTLESHIP

## The Old Commander Sneered at Him But the Fury of a Gale Brings a Perilous Mission and Bob McAllister's Big Chance

The plane faltered and a shout of dismay rose from the crew!

"Your orders, sir?" Mattson's voice had just the proper amount of insistence, for, despite the captain's views on the matter of the relative importance of airplanes and battle-wagons, orders were orders.

"Old Tradition" swung around again.

"Signal the *Tennessee* our instructions and at eight bells break formation and take the ship about." With these words he flung off the bridge and disappeared into the chart-room.

Mattson was not so old that he could not remember with a certain wistful sadness his own ensign days.

"Some poor kid is going to catch the old devil for a while," he muttered to himself, "but 'Old Tradition' has made a man out of more than one of them."

Bob McAllister had topped his class at Annapolis in aeronautics and no one was surprised, when the official appointments were made known, to hear that he was to be immediately assigned to active duty at sea. To say that young Bob was pleased is putting it mildly, for action was what he craved and there would be an added thrill in flying a land-plane over a watery field.

He was just a bit conscious of the burnished wings on his breast as he took the Gold Coast Limited for the west coast where he was to join the *Saratoga*, already waiting for him. As the train sped across the country, he resolved in all the arrogant pride of his shining youth, that never would he besmirch the glory of his wings! He would carry to ever greater glory the new-found tradition of the service—dare and succeed.

A week later, in the office of Captain Russell, he presented his papers.

"Old Tradition" read them without a word. Then he slowly rose from his chair, towering head and shoulders above the young ensign before him. From his height he looked down on the stripling, still untried. The down on the boy's cheek brought a smile of scorn to his lips. Under the bitter scrutiny of those hard eyes, Bob felt the blood rush to his face and he winced uncomfortably. Still, he stood his ground at sharp attention.

"So you're a flying ensign? That's it, eh?"

"Yes, sir."

Bob flushed a hot red. A surge of swift anger swept over him. He resented with all his youth the scorn in that sharp "eh?" flung out by his commander. "Old Tradition" was quick to see the glint in his eye and pressed his advantage.

"You're out of school now. You'll have to grow up. Toe the mark like a man."

Bob was on the verge of a sharp rejoinder when Captain Russell continued.

"We sail this evening. In fact, as soon as you get your plane aboard. We've been waiting for you. Report to Commander Mattson for instructions. That will be all."

AT the curt dismissal, Ensign McAllister went in search of Commander Mattson with a blind, bitter resentment in his heart for his captain. The man had no right to presume so much on his youth until he had failed. He would show him—just wait.

He found Commander Mattson and the latter's decent dignity restored him to his usual high spirits.

"You will take this order to Commander Wright at the flying field and he will turn over to you, on its presentation, your plane."

"Yes, sir."

"In the meantime, we will move the ship to midstream so that you will be able to come aboard. We then sail at once. We are now three hours behind our sailing orders so it is not necessary to tell you that speed is urgent."

Another hour and Bob McAllister was winging his

way across the bay. From his height the *Saratoga* appeared a miniature fortress, tugging at her anchor in an ebb tide.

"This is the life," thought Bob. "This is action. A landing and in a few short hours I will be out at sea. Nothing slow about the air service in the navy, one gets the thrill of both branches of the service."

Bob banked and circled the ship. His heart and mind were set on making a perfect landing, difficult as it was bound to be. He felt that if he succeeded, he might in some small measure placate the bitterness of Captain Russell. He did not want to be considered merely an accessory. He did not want to be "just tolerated."

It would be hard for a time, he knew, getting the old man to realize the value of a plane at sea but he would show him in time. He must be patient. His game must be a waiting one till his opportunity came; his opportunity to show that not only he, but his plane and the entire service, were indispensable.

A landing on the deck of an aircraft carrier is not easy at any time, but Bob had complete confidence both in his plane and his ability to bring it successfully through the most delicate of aerial maneuvers.

He circled the ship in graceful spirals, rapidly losing altitude. Another spiral and Bob straightened out at an altitude of three hundred feet.

Straight ahead was the deck of the *Saratoga*. Then with his stick sharply forward, he put his plane into a sharp dive. Down, down he swooped, every nerve in his body in tune with the taut-strung rigging of his ship. He killed his motor and flattened off.

He fish-tailed rapidly to decrease his speed and then just as he was about to settle to the deck in a three-point landing, the treacherous tide that had tugged so vainly at the anchor of the *Saratoga* swung the mighty ship on a slack cable. The two or three feet the Saratoga swung to the left were enough to spoil Bob's perfect landing and to make of it a near disaster, and the end of his dreams.

Bob did not crash, nor did he run his plane over the side, but he came very near doing both. He just managed to bring her to a dead stop, perilously over the brink, with one wheel of the landing-gear hanging over the side. Only the quick action of the deck crew had prevented the complete wrecking of the plane.

Bob climbed out of the cockpit, a sickening lump in his throat. Just when he had so much wanted to succeed—to be so near disaster. He felt ashamed, chagrined, that his advent to the ship should be marred by a poor landing, especially so, as many of the crew were looking on.

EVEN though it was through no fault of his, he could not help feeling that they held him responsible. True, there was no accounting for that side-slip of the *Saratoga* in the tide. It was one of the many difficulties of operating a land-plane at sea that had so intrigued young, inexperienced Bob with his assignment. However, the realization that even the most experienced flyers at times failed in the landing, was little solace.

What made the sting doubly sharp was the fact that Bob saw Captain Russell standing on the bridge taking in the situation. Even from that distance Bob felt his bitter, sharp eyes on him. Though there was no word said, he could almost hear the captain say, "See, I told you. Just as I predicted. Wings on battleships! Bah!"

BOB turned toward his plane, sick at heart. He stooped down and looked at her landing-gear and was relieved to see that no damage had been done. He had that, at least, to be thankful for. Well, it had been a narrow escape and he was determined to see that it never happened again. Giving his men a hand, they wheeled the plane to the hatch, lowered her and made her fast for the night.

On his way to his quarters, he passed Captain Russell, now busily engaged in getting his ship under way. The impulse came to Bob to explain how the accident occurred, but he conquered it, for he knew that he would be met with nothing but scorn. "Old Tradition" ignored him completely, as if he indeed were a small child discovered in some mischief. His time had not yet come to prove his worth.

That night in the officers' mess Captain Russell had his say.

"Well, Ensign McAllister," he began, "you still think you'll make the grade, do you?"

Bob resented the use of the word "Ensign" when addressed directly by that designation. He felt it was an intended reflection on his youth and on the poor landing he had made that afternoon.

"Yes, sir, I do," he replied. He determined to stick to his guns.

"You do, do you? And after a landing like that? What would you do at sea in a typhoon? This afternoon, with the bay like a ballroom floor, in another foot you'd have wrecked the plane, lost a dozen or so of my best men and your own young life into the bargain, to say nothing of delaying our leaving port for hours."

"Old Tradition" purposely raised his voice so that all in the mess could hear. He was deliberately baiting the youth, he knew, but after all, it was a good test for a man. Bob bit his lip to keep back the angry words that rushed to them. "This is all because I made a poor landing," he thought. He almost wished he had wrecked his plane that afternoon, which would have put him ashore again.

A moment later he recognized the unworthiness of his thought and regretted it. The best thing for him to do, according to the glorious tradition he had come to uphold, was to weather the storm. It could not always be like this, he knew. Despite the captain, he would rigorously attend his duties—no man could do more than that.

Captain Russell glanced around the table challenging any one to dispute his statement. Every officer kept a discreet silence, but there were many there who sympathized with the young ensign.

"Well," continued Captain Russell, "am I right?"

Bob was silent a moment and then asserted himself. "No, sir, I don't think you are."

Bob's simple statement of denial had an electric


## WINGS OF VALOR!

EVERY ambitious youth has dreamed of days when knights of old "won their spurs." Winning one's spurs in 1930 can be translated into winning one's "wings."

Read how Jimmy Webster, Jr., a modern knight of old, wins his wings in a stirring yarn of the air—"Wings of Valor," our new serial, by Jack D'Arcy which starts in the May issue of MODEL AIRPLANE NEWS. On all news stands April 23rd next.

effect on the assembled officers. A breathless hush fell over the room. All eyes were turned towards the grizzled, sea-weathered captain and the young untried ensign, daring to contradict him.

Captain Russell himself was no less shocked and surprised than the rest. His face turned a dull, brick-red. He spluttered! He fumed! He choked, before he finally found his voice with a roar.

"What!" he demanded.

Bob stood his ground, "I don't agree with you, sir," he said firmly. "The accident this afternoon was not my fault. The tide swung the ship just as I was about to land."

NO sooner had he spoken the words than Bob regretted them. He would have given anything to recall his foolish statement, but it was too late. "Old Tradition" jumped on his words even before they were out of his mouth. This was what he had been waiting for, Bob realized, but too late.

"What! Not your fault? By the holy anchor-chain, you're not on land, now, sir, you're at sea. It is not my fault when we run into a typhoon, but still I have to bring my ship through!"

With this note of disgust Captain Russell stamped out of the mess leaving behind him a humiliated, heart-sick boy.

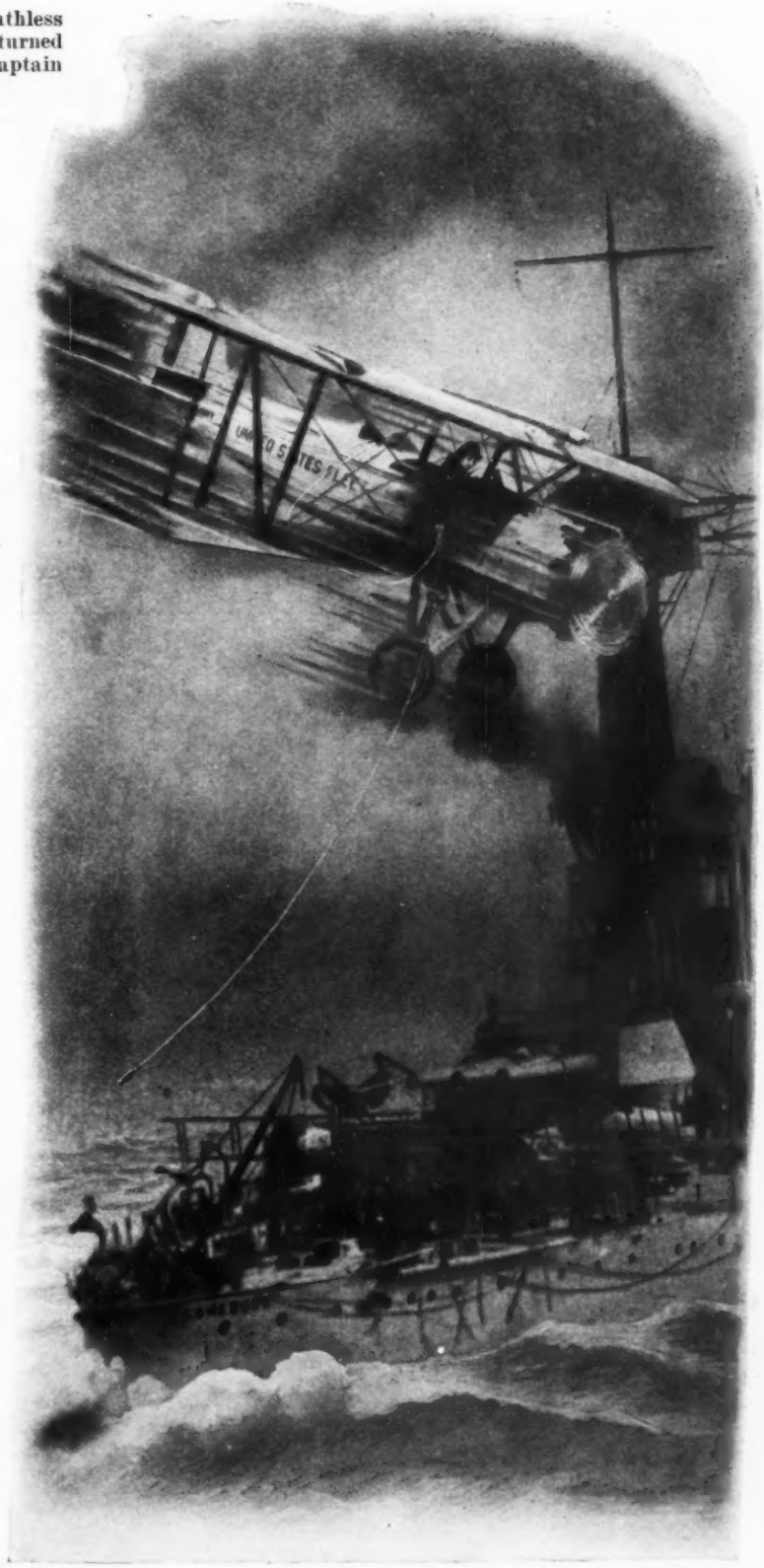
For days Bob fretted through idle inactivity while all about him other officers were busy at their appointed tasks. He felt out of place, inadequate, of no use.

Bob felt a bitter, silent, seething enmity for his superior, and with each succeeding day of inactivity found it more difficult to conceal. The corrosive thought that maybe after all his superior was right, gave him no peace.

Late one evening, the fleet converged for battle practice. At last! Bob felt his chance to redeem himself had come. He could hardly wait for the following morning to get his plane in the air. He would show them, he would show the old tradition just how useful an airplane could be at sea if given the chance.

He was up with the sun the next morning and long before the hour for the commencement of operations had arrived, had his plane tuned to the last ounce of perfection. The signal came at last to Bob's impatient delight and feeding the gas, he gave the signal for his men to pull away the chocks.

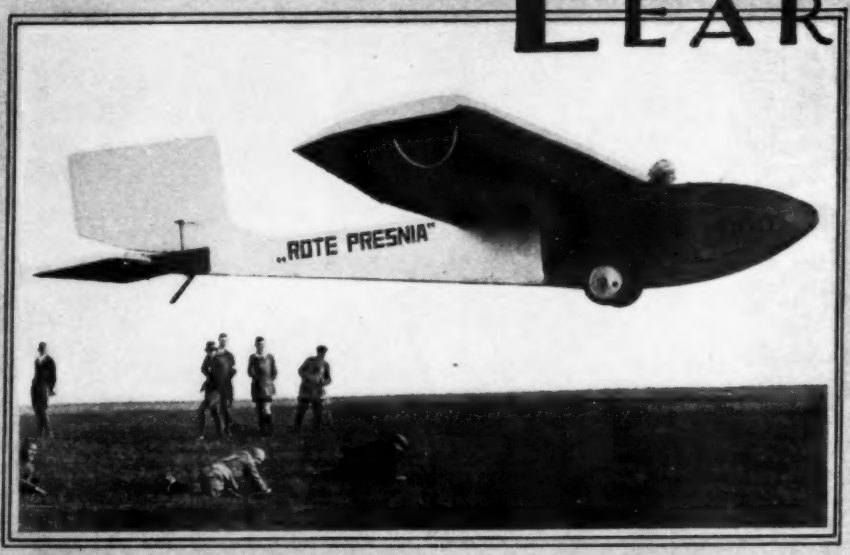
He gained speed down the deck, and then, opening his throttle to the limit, almost jumped into the air. He zoomed towards the ceiling at what seemed a dangerous angle, but just as the plane began to lose momentum he dropped her nose, straightened out and began to climb toward the ceiling again for necessary altitude.



The rope came down. Bob had triumphed over the raging seas! Eager hands on the deck grasped it, marveling at the nerve of the intrepid ensign

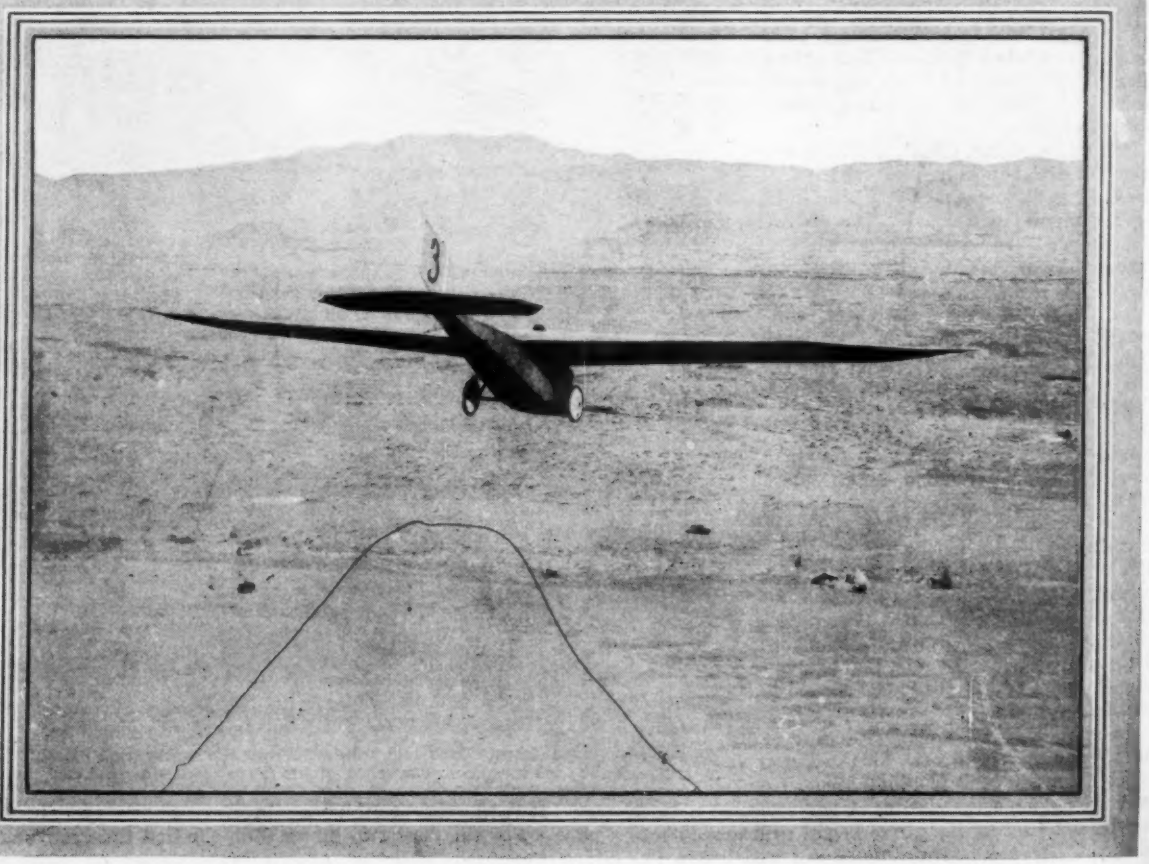
For the next two hours, Bob thrilled the crew of the *Saratoga* with a superb (*Continued on page* 62)

# LEARNING




"ROTE PRESNIA," the glider (at left) judged best among the Russian entries in recent glider contests in Germany

BELOW is seen one of M. Barbot's gliders at the Biskra meet. He is shown taking-off from the top of the hill of El-Delooatt. Many gliding records were established over these sandy wastes of Algeria



# to FLY a GLIDER

## Up-to-the-Minute Data on How to Join in This New and Thrilling Sport of Sail Flying

### By O. H. KNEEN

A RICKETY freight train went creaking by. The little four-wheeled cars ran on wooden rails. A tiny puffing wood-burning engine, with a funnel, just managed to draw the train along on the level for a few miles.

That was just about a hundred years ago. Few indeed of those who saw the strange procession behind the "iron horse" believed that the railroad would ever be a competitor of the good old horse for getting over the ground in a hurry.

Yet some of those who jeered at these first attempts to replace animal muscles with steel and steam, lived to wait at crossings while freight trains, more than a mile long, go clicking by on their way across the continent.

Few of us are far-sighted enough to foresee the results of similar experiments in our own day. We take the railroad and the motor car and the truck as a matter of course, as our fathers came to accept the railway and the trolley.

Yet we have already entered the air-transport age. Experiments made a short time ago, in Germany and in California, will probably have greater effect on the future moving of goods and people, than those first freight trains had on the horse-drawn traffic of a century ago.

The first air express train in history took off near a Berlin aircraft factory. To the airplane was attached two light planes without motors, each with a pilot. The remarkable flying train climbed to 1,200 feet.

Then the last pilot cast off the towing rope and started a downward glide to the field below. A few moments later the other pilot followed suit. Both landed safely, for they were piloting gliders of the latest design, efficient and easily controlled motorless planes that ride the air waves like great birds. Later tests were also successful.

A similar experiment was made in California. The glider pilot likewise was able to cast off and glide down safely, to a landing as light as that of a bird. Such experiments point the way to almost incredible developments in air transport.

We shall in a few years see long trains of gliders winging their way across the country, simply slowing down over the various airports as the last "car" is uncoupled and glides noiselessly downward, while the train goes roaring on to the next port of call.

Perhaps the "engine" of this strange flying freight will be a huge passenger carrying plane, such as are already being built to carry 100 or more in comfort. The extra power required to tow the string of gliders will not be very great.

Scarcely any time will be lost from the fast schedule as each glider is cast adrift. Perhaps several will land at the larger airports. Passengers may be landed as safely and comfortably as they could desire. What a chance for an airminded youth to "Join the Air Freight and See the World."!

Although this country gave the power-driven airplane to the world, and has done much for its later development, not until the last year did we begin to realize the possibilities of gliders. All the early flying experience of the Wright brothers was achieved on gliders, there being no suitable motors when they set out to chase the birds along the sky trails.

Once a good motor had been invented, however, we forgot that we could soar and glide without a whirling propeller. No one tried riding the air waves as do the birds. Did you ever watch a seagull fly for an hour or so, without effort, scarcely moving its wings, yet dipping and rising and perhaps following a ship for miles?

Though commercial uses of gliders are as yet untouched, gliding as a sport has again come back to America. A large number of young men and women today are beginning to look to gliding as a step toward achieving their ambition to fly.

MANY boys and girls all over the country in the schools have aviation as their goal. Many who cannot afford to go to flying schools desire to get into active connection with aviation. For these the glider offers an inexpensive and highly successful method of learning how to pilot a plane. It also affords a chance to see how all "ships of the air" are constructed, operated and maintained in safe flying condition.

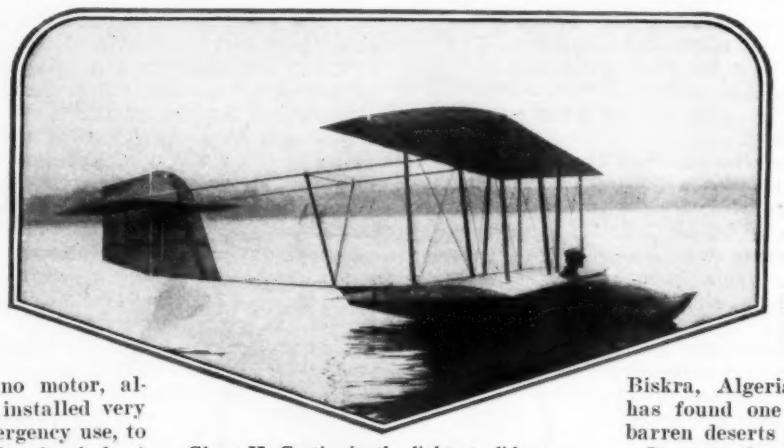
A glider is an airplane of highly efficient design, able to fly without a motor. It is not a machine for an amateur to design, for its safe and satisfactory operation requires aerodynamic qualities even superior to those of an ordinary airplane. It took some years for the technical students at Darmstadt, Germany, to work out the first gliders that would remain aloft for hours at a time. They had to devise a new technique of construction and of operation. Amateurs are strongly advised to obtain their instructions, their gliders and their expert instructors from associations

competent to aid them in this kind of work.

All the early airmen learned to fly by building gliders and using them to "get the feel of the air." In so doing they took many chances, for the design of gliders is far superior today. Early gliding men, for instance, usually had their feet dangling below, ready for a quick landing. This is sometimes done today, but the more advanced gliders provide a fuselage and controls much like the regular airplane.

GLIDING today is not only safe but it is a thrilling sport. In true gliding the operator faces the wind on top of a hill, and hops off into the wind. He rides outward and slowly downward, unless by chance he strikes an upcurrent. If he can rise upward, perhaps higher than where he started, he is then soaring. The time record for remaining aloft is held by a German who glided and soared for more than fourteen hours, showing that the sport of gliding is limited only by the winds and the ability of the operator to "feel them out." The American record is approximately six hours.

Today there are some 15,000 members of gliding clubs in Germany, men and women, boys and girls of all ages. They learn to use the rudder and elevators and ailerons for flights that are exactly like airplane trips, except that they are made in silence. There is no motor, although a few have installed very light motors for emergency use, to compensate for lack of wind at some point.



Glenn H. Curtiss in the lightest glider ever built on trial at Manhasset Bay, Long Island, N. Y., in which he hopped off from the water's surface. The wings are of the finest silk fabric and the body all metal, lightest weight wood being used for ribs and other parts

On one flight the record-holder of Germany, Ferdinand Schulz, managed to maneuver from one air-column to another, until he reached a height of 2,600 feet. Here he soared for more than four hours. On another flight he carried a passenger for nine hours. The machine weighed 331 pounds empty, yet it soared like a bird.

Recently at the tenth gliders' contest in the Rhon Mountains the record distance flight was made by Robert Kronfield, noted Viennese glider pilot. He took off from Wasserkuppe, the summit of the mountain range and flew for 66 miles, landing 13 miles from Gera, after crossing the Thuringian Mountains at an altitude of about 9,842 feet.

In hilly regions gliding offers a practicable method of learning to fly. Says a recent writer in *Air Travel News:*

"Beyond the fact that motorless flying is unquestionably an invigorating and thrilling sport, there is a more tangible reason for its existence. It offers a safe, economical, and highly efficient pilot-training method which has been largely adopted in Europe and will find its place in the American flying schools. In the glider, an absolute novice in actual flying can, with proper ground instruction, make his very first training flight a more or less successful solo.

"The ship flies slowly, and the instructor will see that sufficient velocity is given at the take-off to carry the student only a few miles in the air. Since the landing speed is about 13 miles an hour, even in the primary training ship, with a good breeze the ground speed is negligible. Then, from these simple, safe flights the instruction can be graduated to longer distances, turns and the like. The glider or soaring ship is equipped with standard aircraft controls and is excellent for training purposes."

Mountain ridges, forests, streams and valleys and all changes in terrain, tend to form air currents that rise and fall. These furnish the support for the light glider and its pilot. It is impossible, on a warm day, not to find some of these currents.

Surfaces like bodies of water, trees, etc., cool the air, which naturally falls in a column. Other surfaces radiate heat, which rises, and these alternating columns of cool and warm air are everywhere. One side of a hill almost invariably has a rising current, while on the other side is a down current.

Sand dunes, like those along the south shore of Lake Michigan, and those of Kitty Hawk, North Carolina, scene of the Wrights' historic glider and airplane flights, are ideal for gliding parties. The strong winds that pile up these sand hills may carry a glider for miles, and the sand is always there for jarless landings.

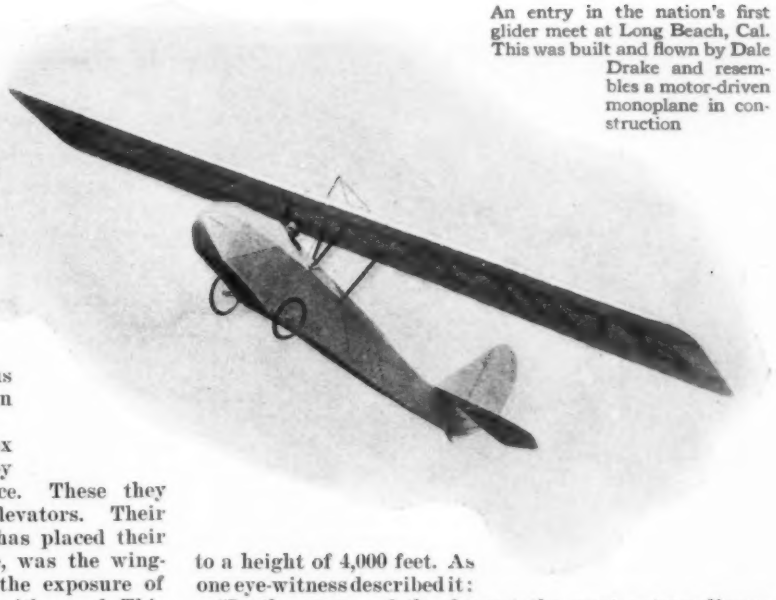
M. Barbot, French gliding expert, recently made several records at Biskra, Algeria. Thus aviation has found one practical use for barren deserts and sandy wastes.

It was the Versailles Treaty, after the World War, that revived the forgotten art of gliding. The Germans, restricted in the building of aviation engines and airplanes, turned their ingenuity to making planes so light that they could be borne on the air currents. In 1921 one of the earliest gliders, by staying in the air for 21 minutes, doubled the record held for ten years by the Wrights.

IMPROVEMENTS now came rapidly, and in 1922 the world was startled by Hentzen's record flight of three hours six minutes. Beautifully streamlined man-carrying birds began to be hatched. A common sight in Germany today are these great "Darmstadt" and other machines sailing noiselessly above the towns and fields. Speeds up to 60 miles an hour have been attained, and wing spreads of 60 feet are common. The sport spread to France and England, and is now rapidly taking hold in this country.

Many of these machines are so simple to build and operate, once the proper design is known, that it is amazing that our ancestors did not stumble on at least their basic principles. For centuries they had watched the birds, heavier than air, many of them weighing twenty pounds or more, yet defying gravity and soaring for hours at a time.

However, expert gliders in early days, like Otto Lilienthal the German and Harry Pilcher the Englishman, were never safe because they could not balance themselves easily while in the air.



An entry in the nation's first glider meet at Long Beach, Cal. This was built and flown by Dale Drake and resembles a motor-driven monoplane in construction

A sudden upcurrent would tip one wing, and they had to shift their bodies with great agility in order to restore an even keel. Lilienthal outrode one great storm in his glider, but on his last flight is believed to have become exhausted, and he lost his life when his glider, with odd, bat-like wings, overturned. Lilienthal added enormously to our knowledge of wind action on inclined surfaces, making thousands of gliding flights. But flying was still a hazardous undertaking when the Wrights began their experiments.

Their early gliders were merely box kites of large size. They rode them by lying flat, to decrease head resistance. These they improved by adding a rudder and elevators. Their greatest contribution, however, which has placed their names in aviation history for all time, was the wing-warping device, whereby changing of the exposure of the wing to the wind altered the lift at either end. This achieved lateral balance. No longer did they have to shift their bodies back and forth. Man's ingenuity had finally conquered the air.

These early gliders of the Wright brothers were rather frail and tricky, but they were so safe, that once the brothers had learned how to control them, they were able to make thousands of glides—more than sixty a day during the season of 1902—without injury, and most of the time without damage to the glider. They made several models of plywood and linen, in later years, merely to study the air and get the "feel of the machine." That is the chief aim of every pilot and student.

"We took up flying at first merely as a sport," Orville Wright said recently. "Later, after we had flown, we believed that more persons would fly for sport than do today. I still believe that the airplane will become popular for sport and recreation purposes."

As early as 1905 Professor J. J. Montgomery, in California, made some remarkable experiments with gliders. He built a tandem monoplane glider weighing only 45 pounds, in which a pilot was lifted by a balloon to a height of 4,000 feet. As one eye-witness described it:

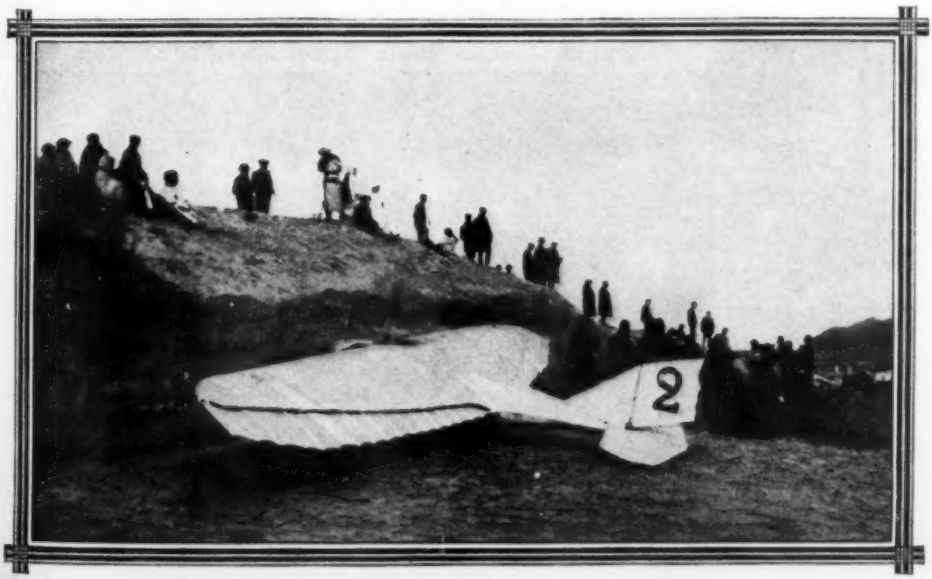
"In the course of the descent the most extraordinary and complex maneuvers were accomplished—spiral and circling turns being executed with an ease and grace almost beyond description, level travel accomplished with the wind and against it, figure-eight evolutions performed without difficulty, and hair-raising dives were terminated by abrupt checking of the movement by changing the angles of the wing surfaces.

"AT times the speed, as estimated by eyewitnesses, was more than sixty miles an hour, and yet after a flight of approximately eight miles in twenty minutes, the machine was brought to rest upon a previously designated spot, three-quarters of a mile from where the balloon was released, so lightly that the aviator (Daniel Maloney) was not even jarred, despite the fact that he was compelled to land on his feet, not on a special alighting gear."

Such a flight could be easily made today, and with even greater safety. Years ago Glenn Curtiss had a glider built for use over water, and raised it by towing it with a motor boat. Gliders have been elevated by towing with an automobile, and this can be done anywhere, making gliding possible, regardless of the absence of hills or elevated points. Colonel Lindbergh made his first glider trip behind a motor car without receiving previous instructions, merely inspecting the controls for a few minutes beforehand.

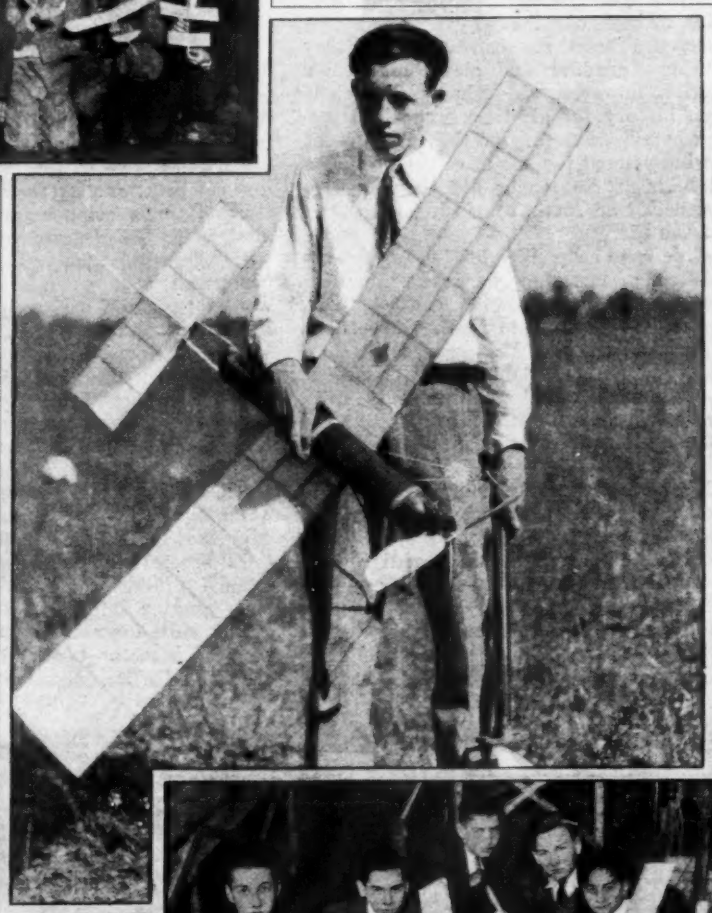
Amelia Earhart, first woman to span the Atlantic, was also the first American woman

(*Continued on page* 66)

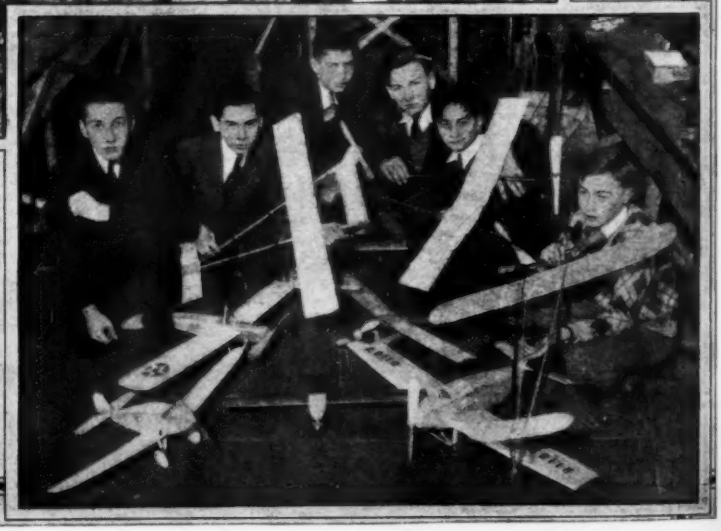



A view of the meet at Biskra, Algiers, showing Barbot's glider in which he broke all records, remaining in the air for eight hours, 55 minutes and 36 seconds

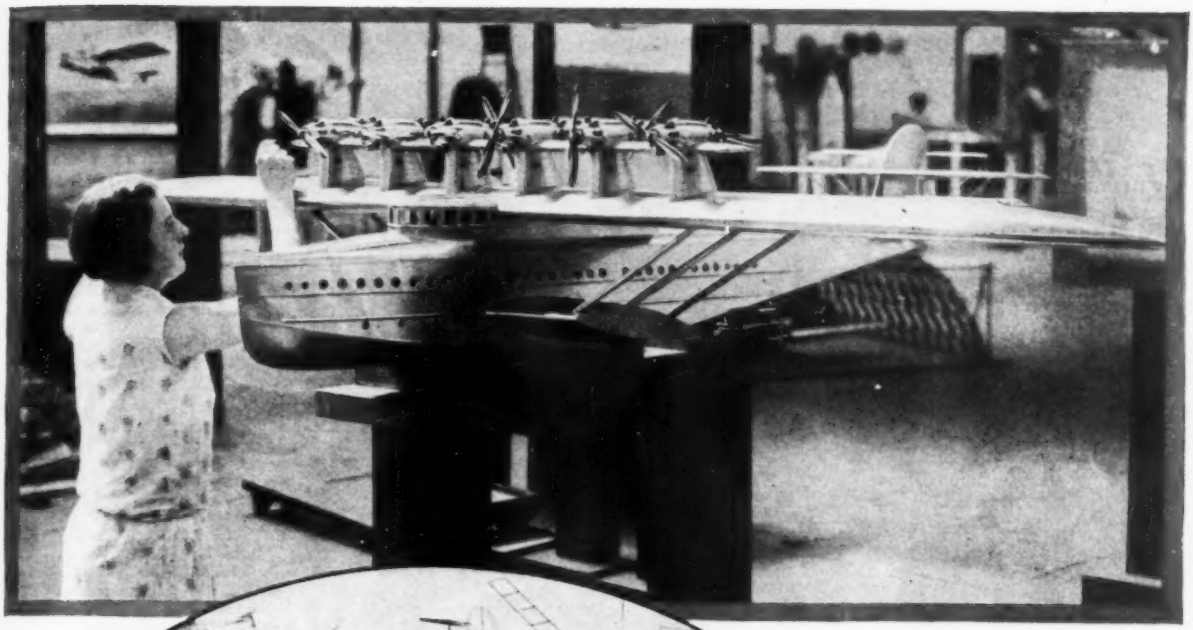
CONTESTANTS in the American Legion model airplane meet at the 71st Regiment Armory, New York City, display their models



HARLEY RICH, Knoxville, Tenn., with his compressed air model at the tournament held under the auspices of the Playground & Recreation Association at Louisville, Ky. This model flew for more than half a minute

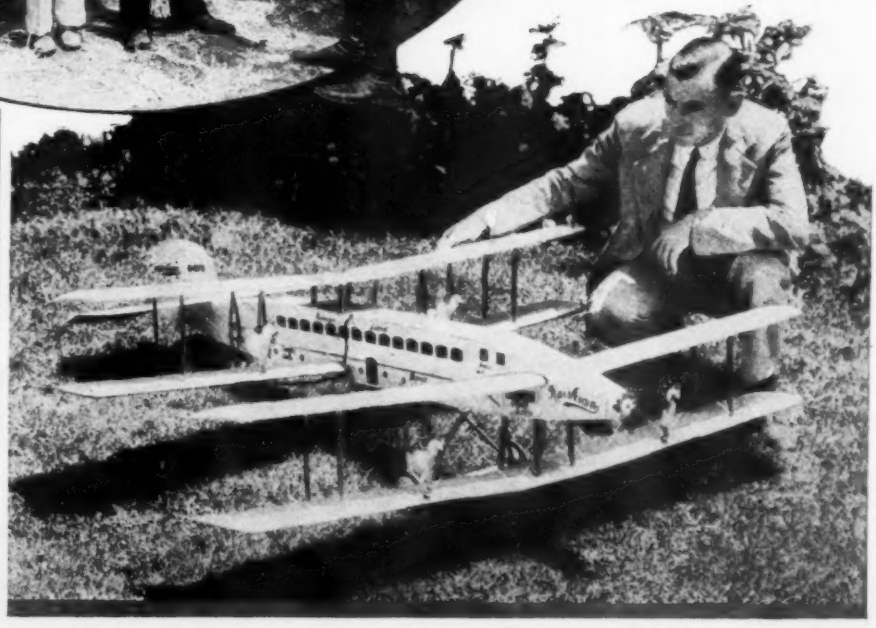


MEMBERS of the Bronx Model Airplane Club and specimens of their handicraft are seen at the right

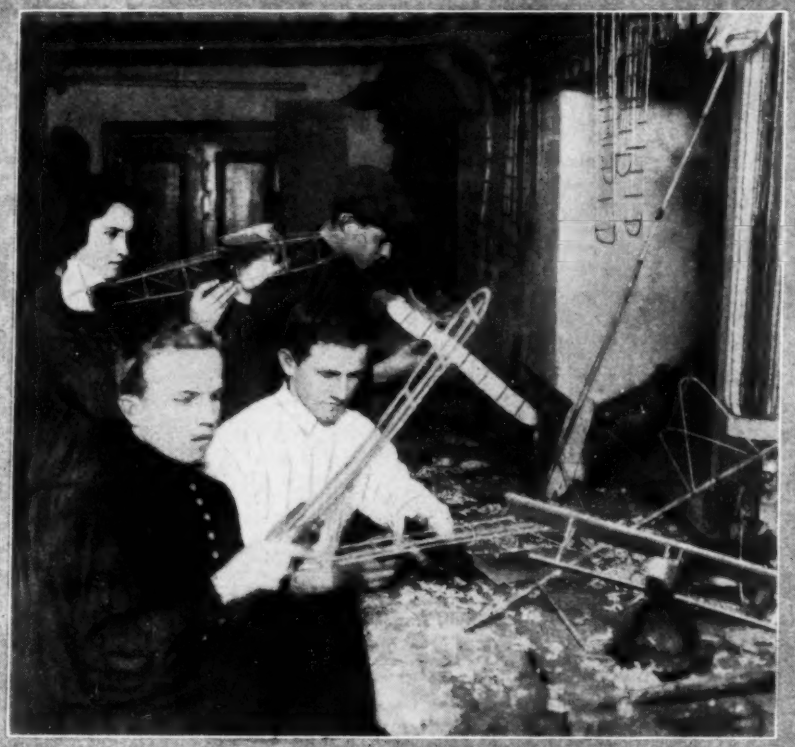


PUTTING the finishing touches to a model of the new German monster, Dornier Do-X, the world's largest aircraft, at the Five Nations Air Show at Olympia, London, England

AT the left, Col. Charles A. Lindbergh and Dudley Steele of Mines Field, Los Angeles, at the miniature airplane contest held there. They are surrounded by a group of model enthusiasts



HAROLD H. KARR, naval aviation pilot, with a model of the tandem biplane he has invented. The plane is capable of lifting 85,000 pounds and has a maximum speed of 135 miles per hour, he claims, and it is 130 feet long, with a wing span of 96 feet. The plane will be equipped with five 420-horsepower engines, and it is estimated that it will carry eighty passengers and baggage 4,000 miles non-stop

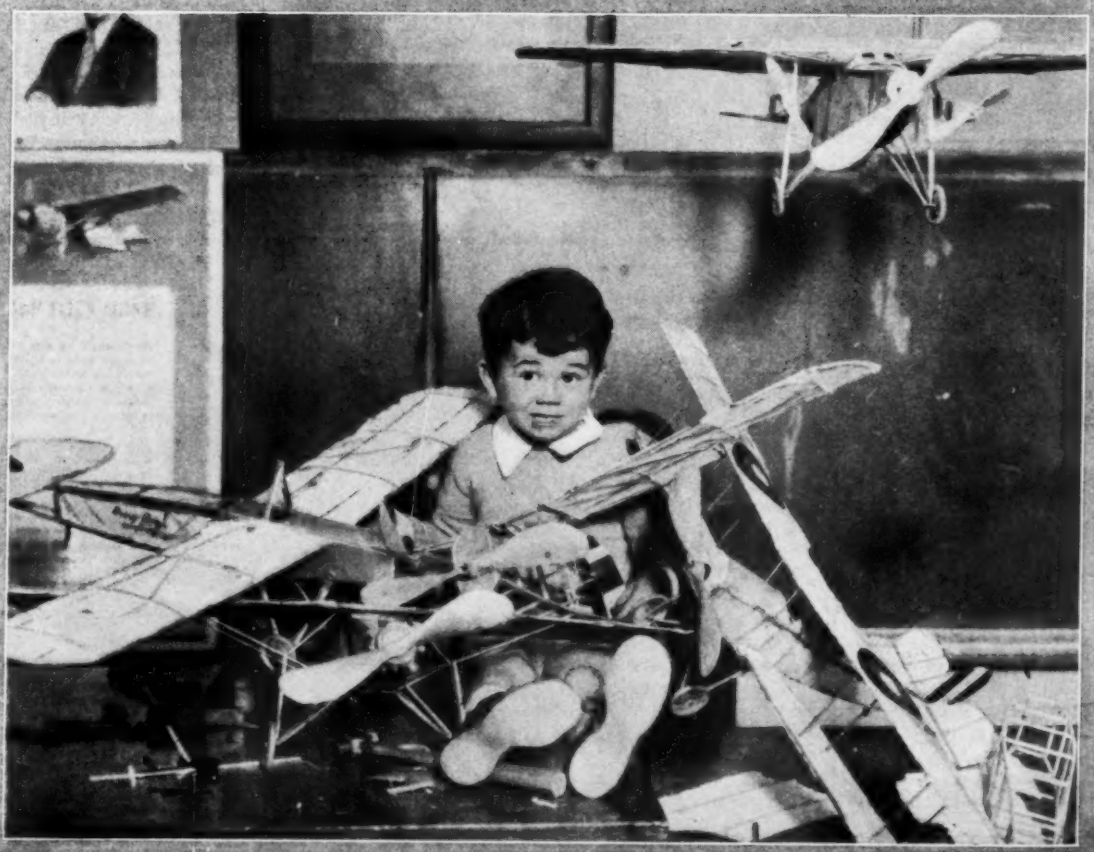


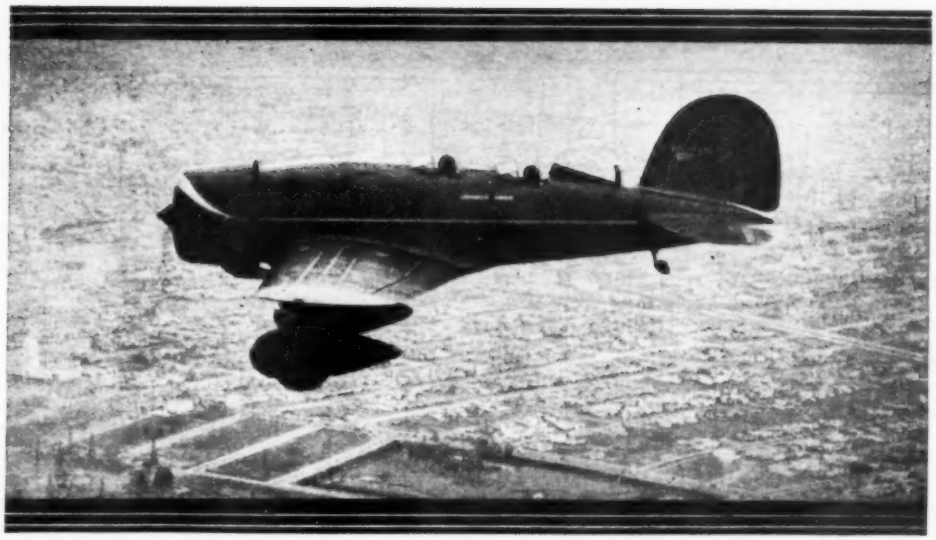
RARE photograph smuggled out of Red Russia by a German photographer causes uneasiness in European diplomatic circles. Next to chemical warfare, aerial warfare is one of the most important items in this vast militaristic program of Red Russia. Young men and women have been given instructions in making models of war planes

*Underwood & Underwood*

PAUL WHITEMAN, JR., the young son of the orchestra leader, with some of the airplanes made by boys attending the Washington School on East 60th Street, New York City

*Wide World Photos*





# How to Build Lindbergh's "Dog Star"

## Wonderful Flying Model of the "Lone Eagle's" New Mystery Low-Winged Lockheed

SOON after his famous flight over the Atlantic and the placing of his Ryan monoplane, the "Spirit of St. Louis," in the Smithsonian Institute at Washington, D. C., Colonel Lindbergh selected the famous Lockheed "Sirius" (Dog Star) as his next plane. This was built to his order and has a high speed of 190 miles per hour and the longest cruising radius of any single-motored airplane.

The Department of Commerce made a special dispensation in granting the new plane the license number of NR211, in view of the fact that the "Spirit of St. Louis" was numbered NX211.

The model designed is a flying replica of the plane and on completion, weighs exactly two ounces and flies more than one hundred feet after taking off from the ground. The colors designated in this article are exactly as those used on Colonel Lindbergh's plane, which combination was selected by this famous flyer himself.

The name, "Sirius," is taken from the Sirius star known as the Dog Star of the heavens. It is the custom of the Lockheed manufacturers to name their products after the various stars and planets; hence the designation of Col. Lindbergh's ship.

The model has an imitation N.A.C.A. engine cowling, so modified at the nose that the motor stick can be detached from the fuselage at will.

### Fuselage

First, go over the drawings carefully and read all special notes regarding the structure of the fuselage so that you will be thoroughly acquainted with the designation numbers, letters and other symbols used to show the various parts and formers.

See Plans on Pages 22 to 29

Formers F-1 to F-9, inclusive, are cut from 1/16″ sheet balsa, shaped as shown in drawings 4, 5 and 6, and sandpapered smoothly. After this has been done, take one of the 1/2″ x 1/2″ x 1″ pieces of balsa and make tail piece F-10 as shown in drawing 6. Then fasten the round side of former F-9 to the flat side of former F-10 and ambroid together. These two parts are shown fastened together in the drawings of the fuselage structure. The motor stick clips should now be fastened to former F-8 as shown in drawing 6, ambroid being used to hold clip in correct position.

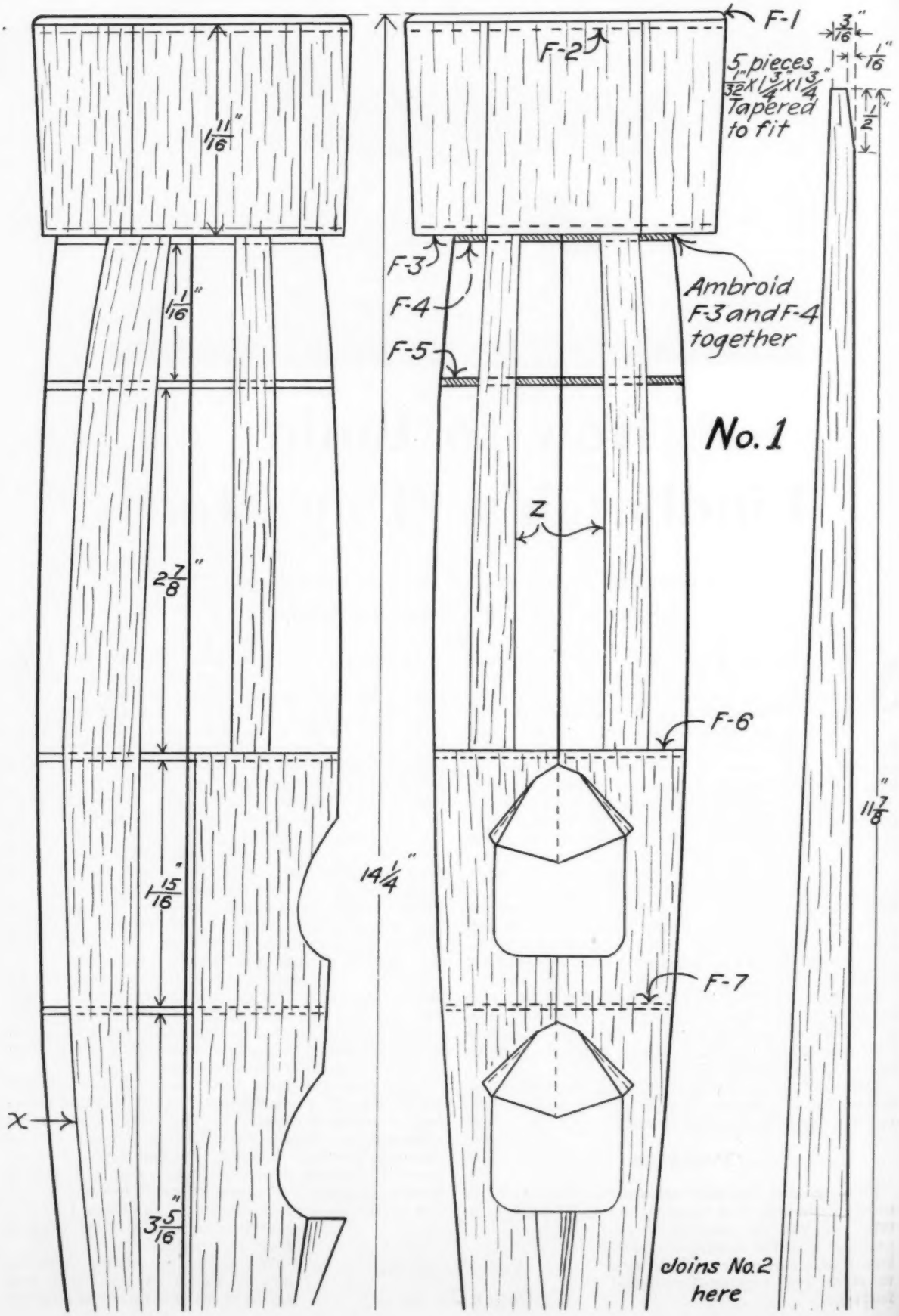
Now take the split bamboo and, with a sharp knife, strip the bamboo in 1/16″ x 1/16″ pieces, four of these to be used at once to hold fuselage formers together. These bamboo strips are ambroided to the sides, top and bottom of formers F-4 to F-10 inclusive, as shown in drawings 1 and 2 by heavy lines. It will be noted that the top stringer goes through former F-9.

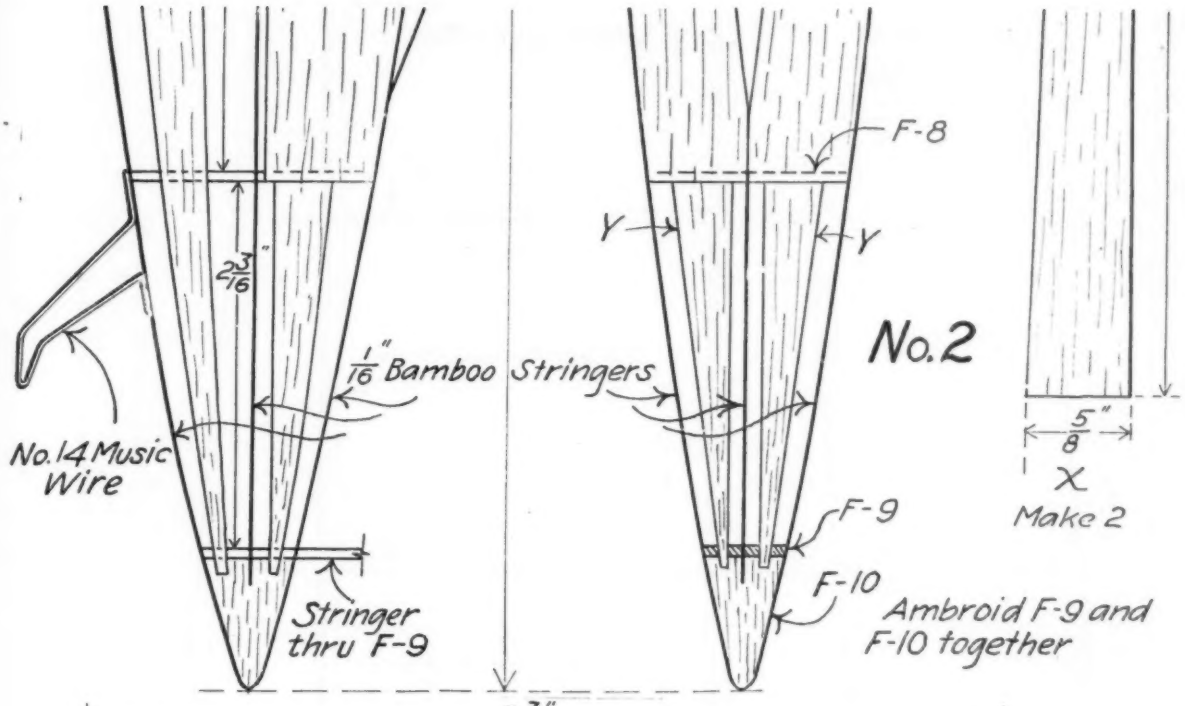
Formers F-3 and F-4 are ambroided together, as shown in drawing 1 of the fuselage construction, making sure that the sides of former F-3 extend to the correct amount as shown. Now take the 1/32″ sheet balsa and cut out the cockpit formers X, Y and Z. Two of each are made of these formers.

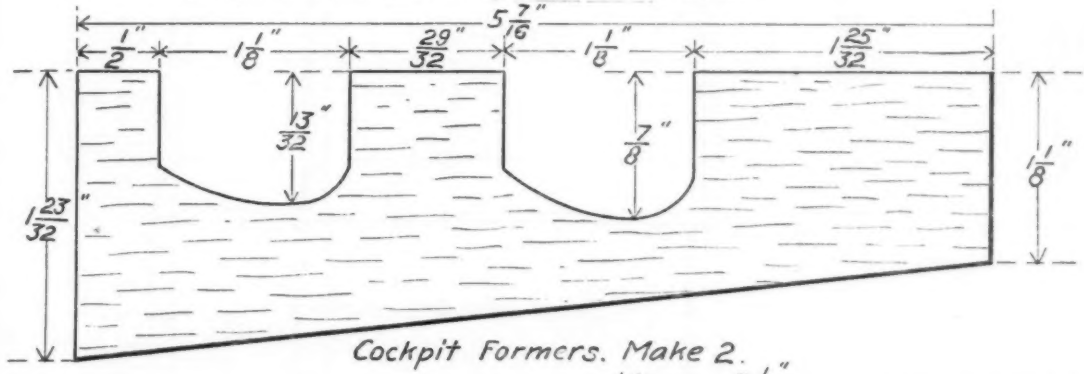
Then from the same 1/32″ material, cut out five 1-3/4″ x 1-3/4″ pieces for the N.A.C.A. cowling covering, as shown in drawing 1. The cockpit formers are ambroided in place between formers F-6 and F-8, as shown in drawings 1 and 2. Former X goes halfway between the side bamboo stringers and the bottom bamboo stringers. Formers Y and Z are put on the top of the fuselage, as shown in drawings 1 and 2.

Now take formers F-1 and F-2 and ambroid together.

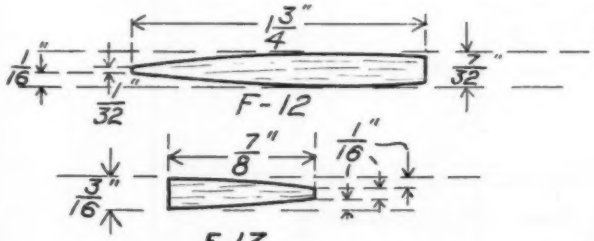
While these are drying, shape the clip M shown in drawing 5 and fasten to the (*Continued on page* 60)


F-1
F-2
3/16"
1/16"
5 pieces 1/32" x 1 3/4" x 1 3/4" Tapered to fit
1/2"
1 11/16"
F-3
F-4
F-5
Ambroid F-3 and F-4 together
1 1/16"
No. 1
Z
2 7/8"
F-6
11 7/8"
14 1/4"
1 15/16"
F-7
X
3 5/16"
Joins No. 2 here

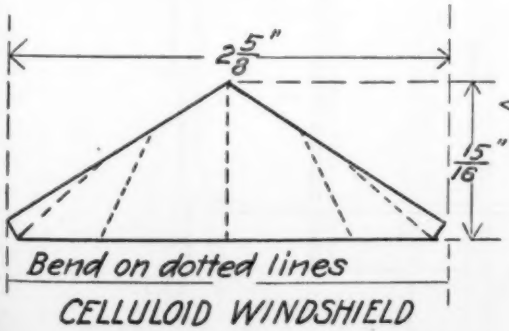


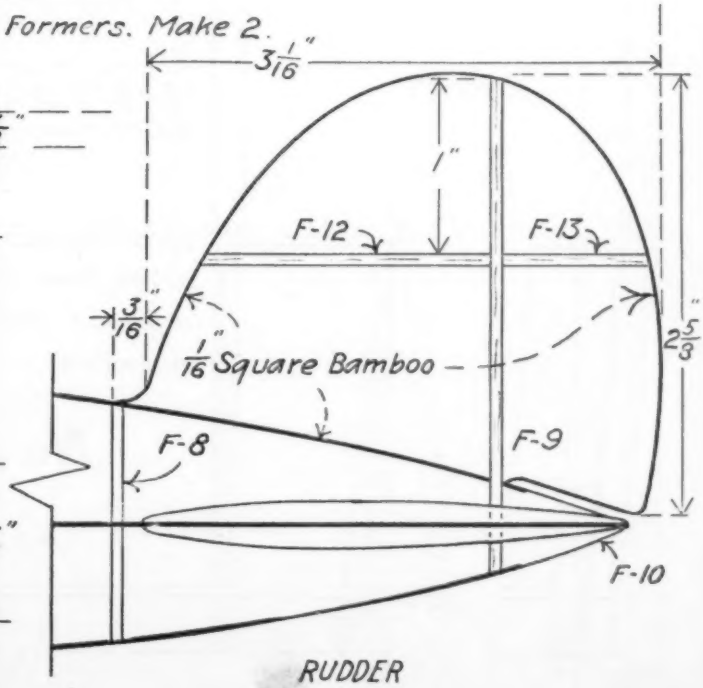

Cockpit Formers. Make 2.



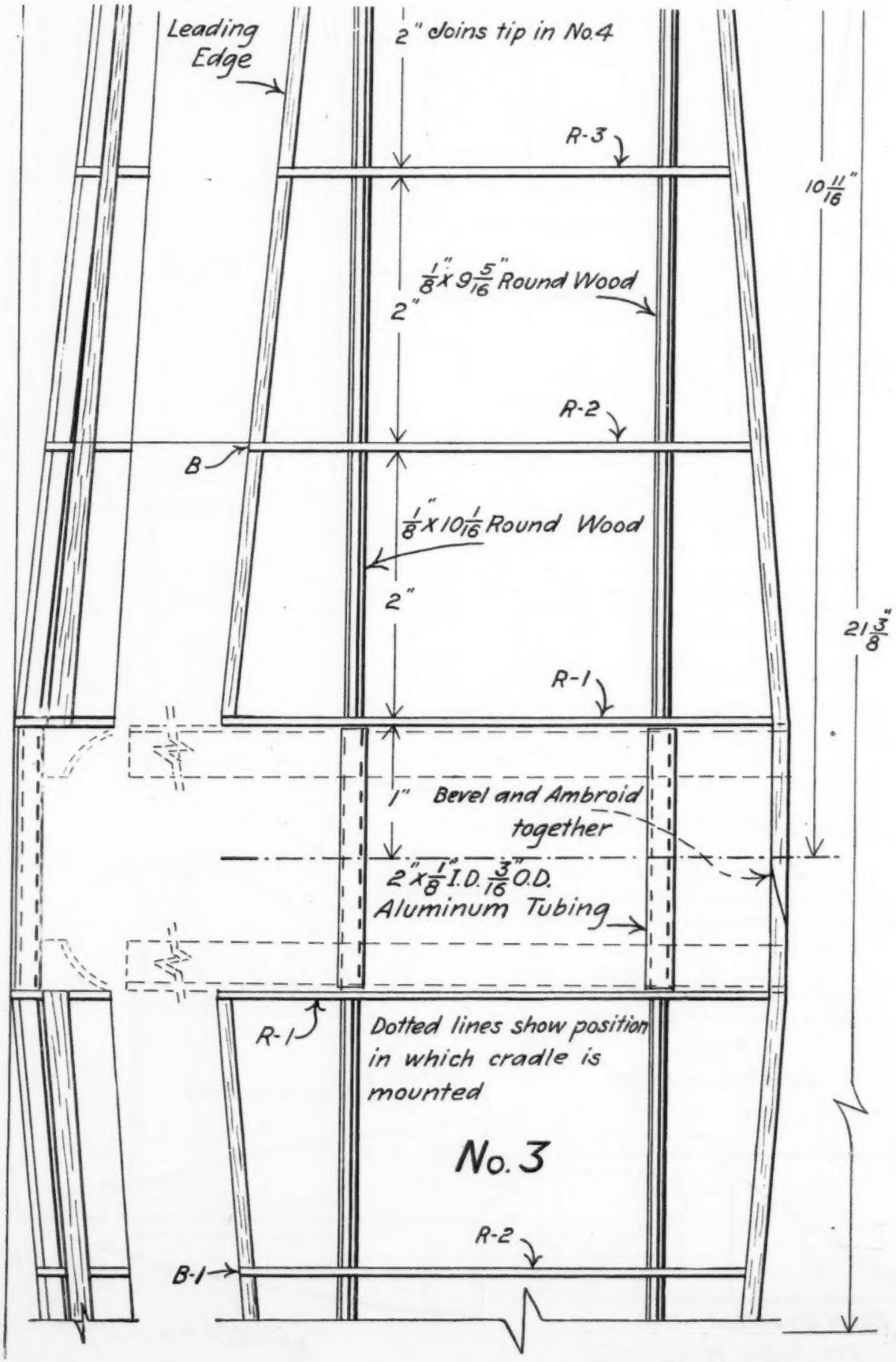

Rudder Formers

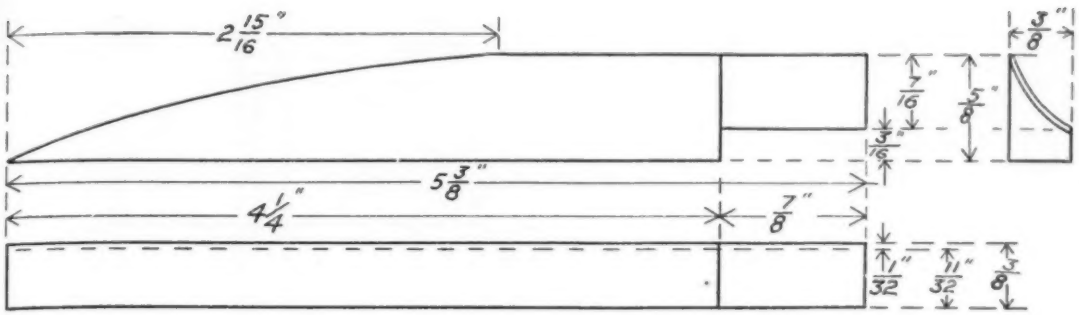


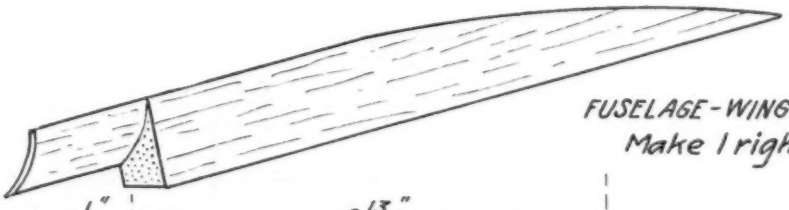

CELLULOID WINDSHIELD



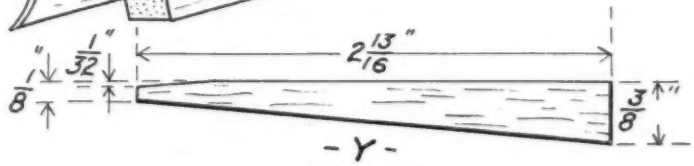

RUDDER


Leading Edge
2" Joins tip in No.4
R-3
10 11/16"
1/8" X 9 5/16" Round Wood
2"
R-2
B
1/8" X 10 1/16" Round Wood
2"
21 3/4"
R-1
1" Bevel and Ambroid together
2" X 1/8" I.D. 3/16" O.D. Aluminum Tubing
R-1
Dotted lines show position in which cradle is mounted
No. 3
R-2
B-1

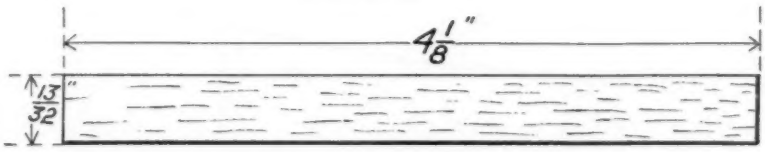


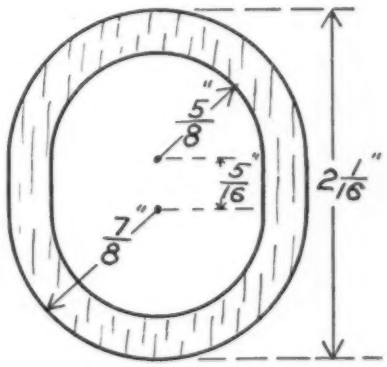
FUSELAGE-WING CRADLE MOUNT
Make 1 right, 1 Left.



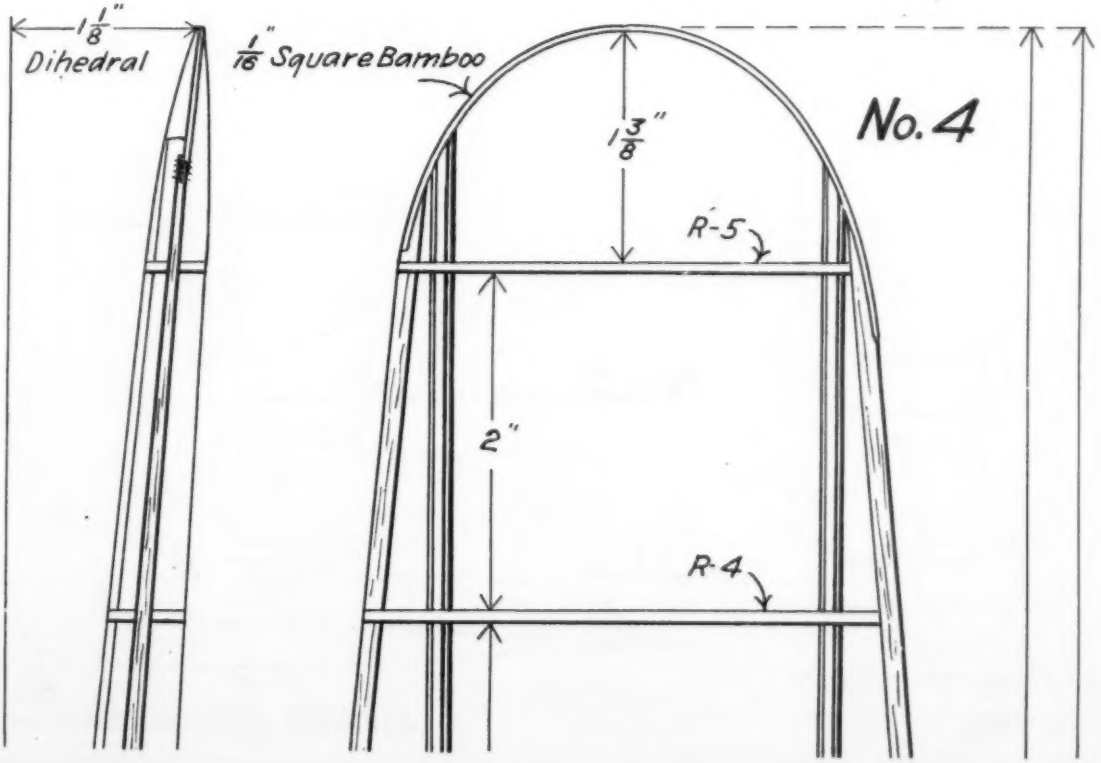

-Y-
Make 2

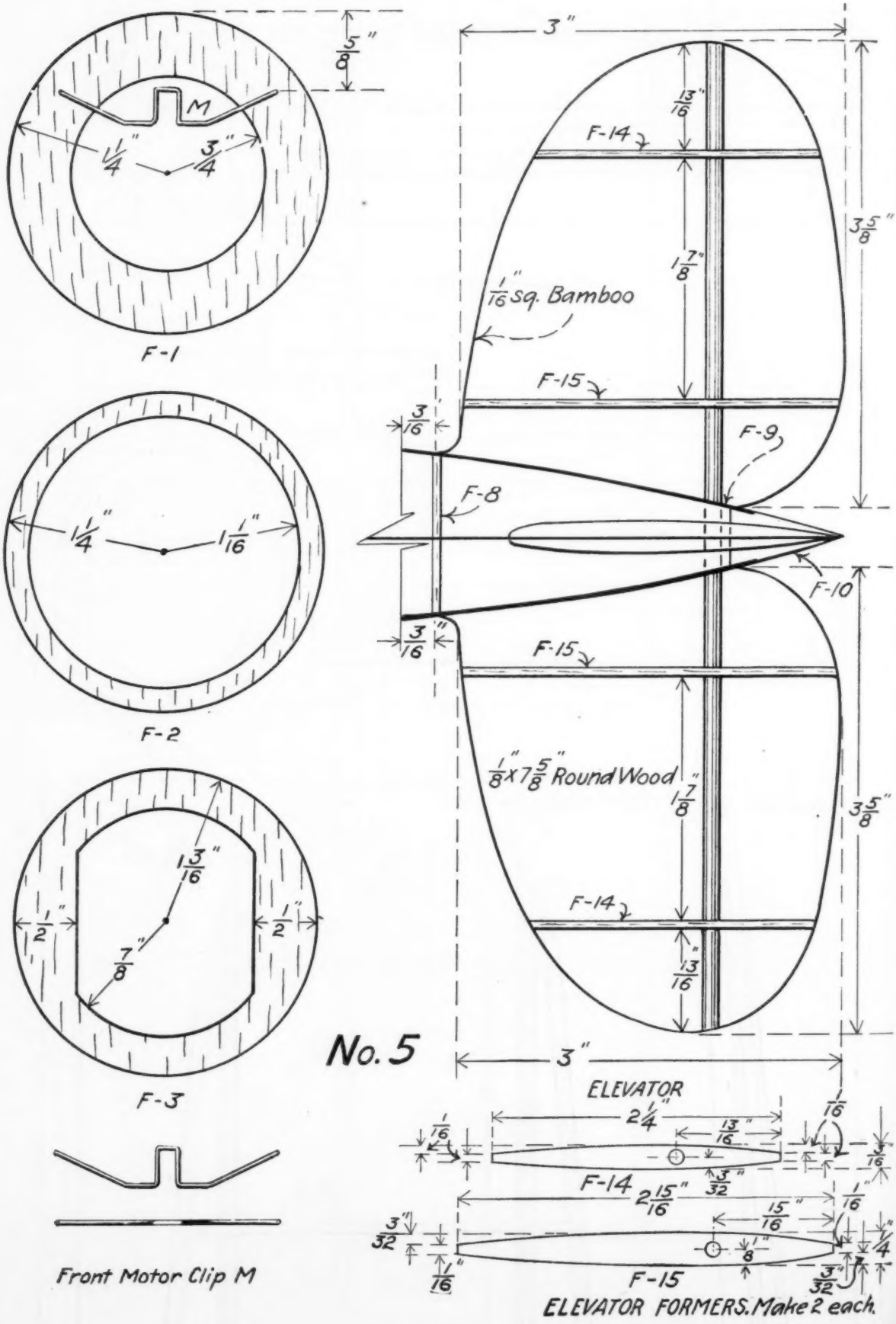


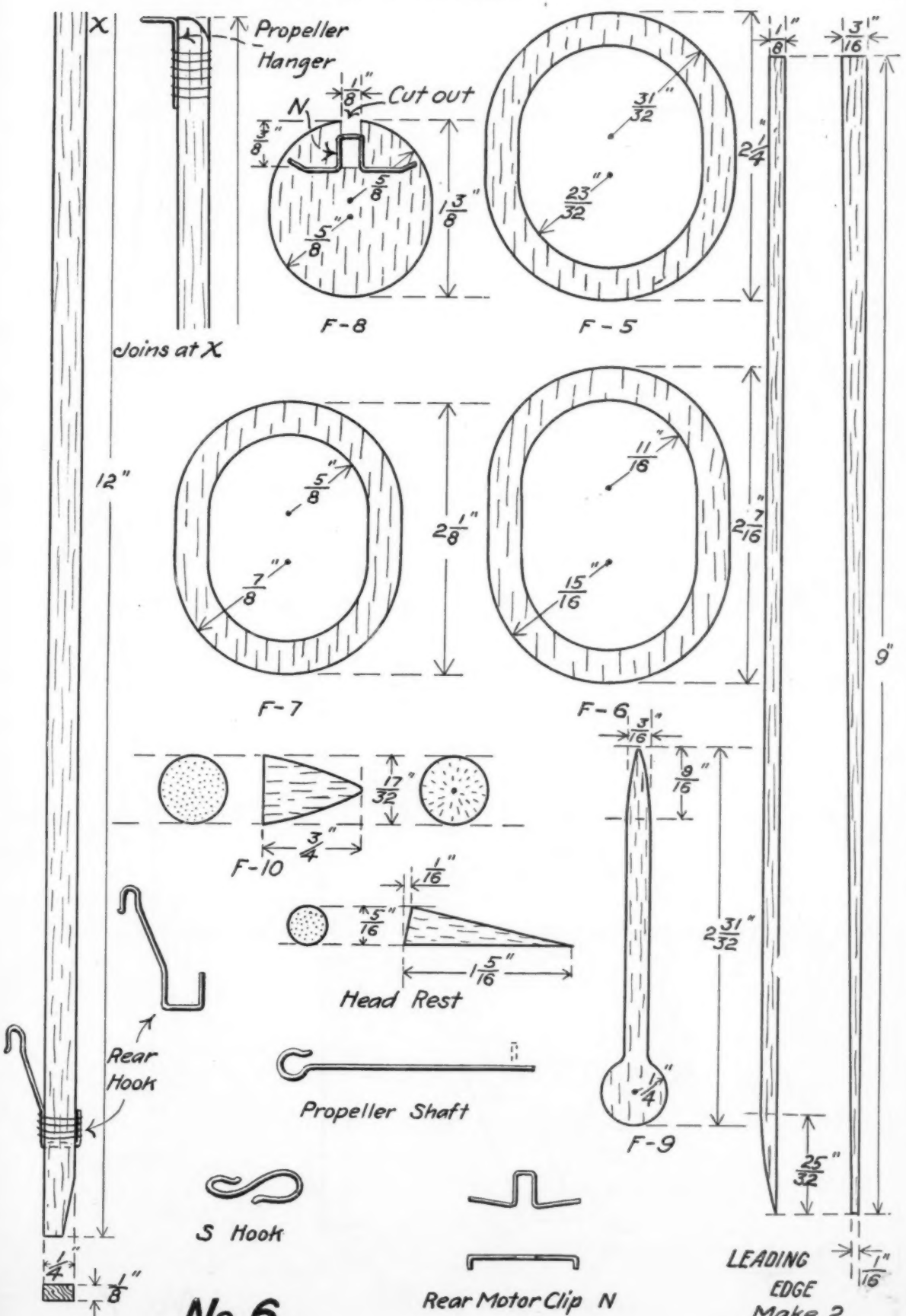

-Z-
Make 2

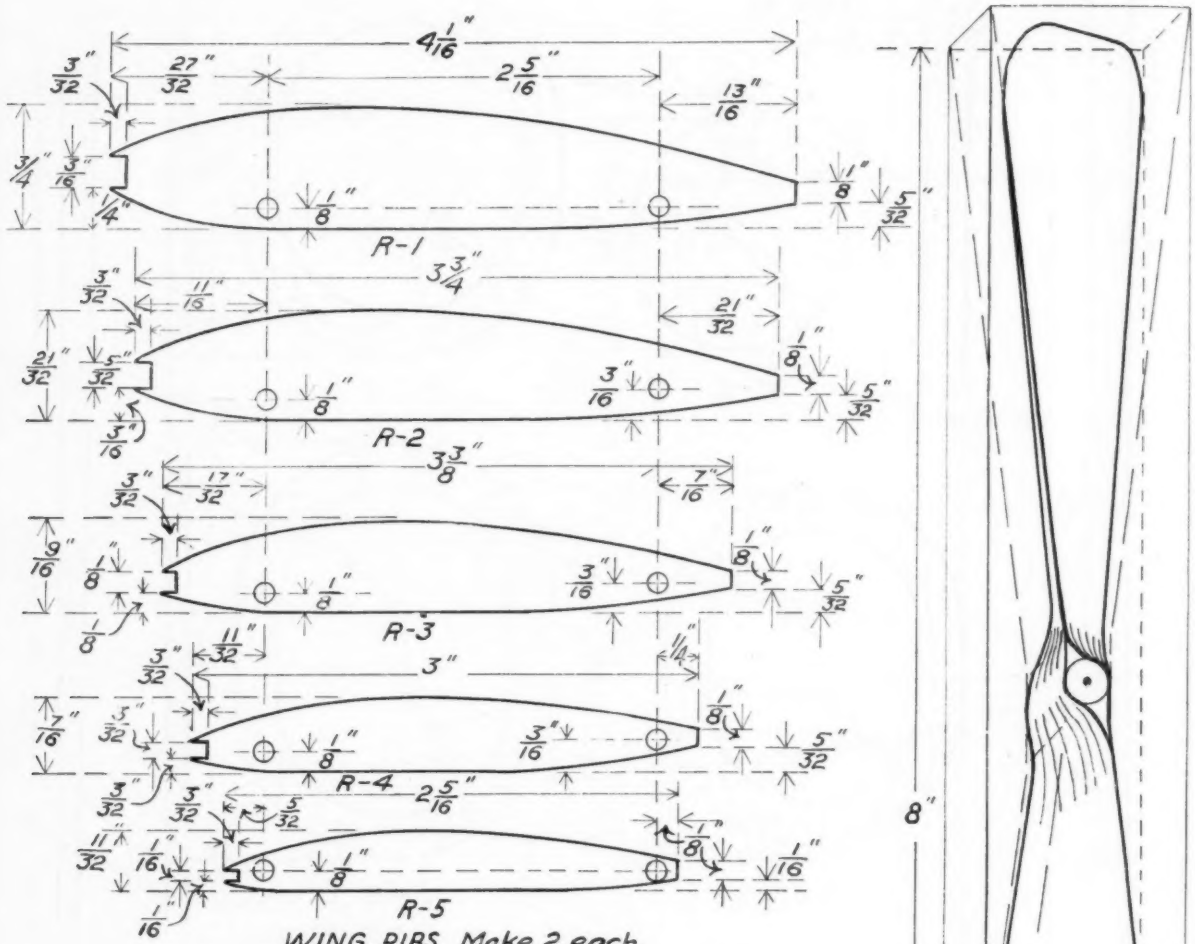



F-4

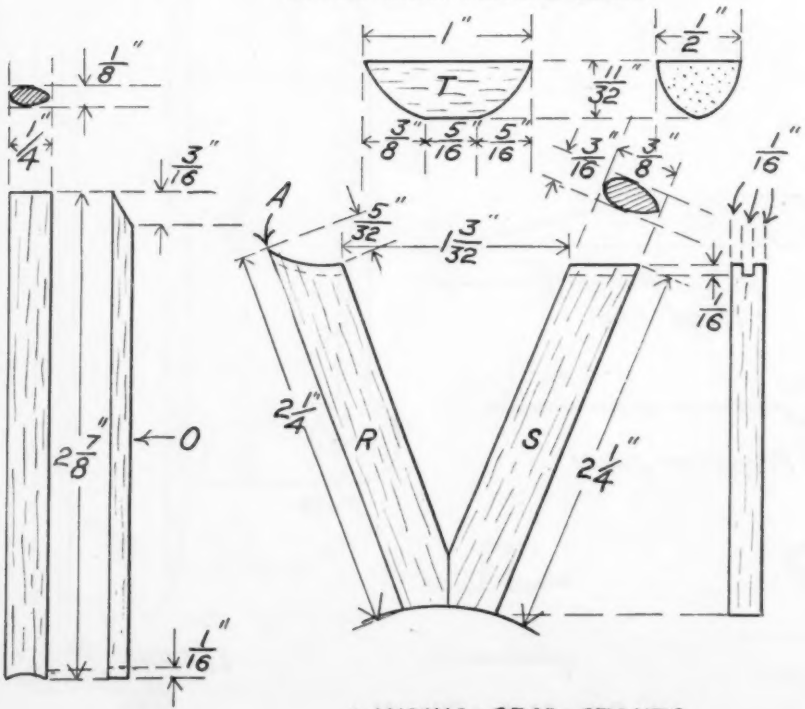



5/8"
M
1 1/4"
3/4"
F-1
1 1/4"
1 1/16"
F-2
1 3/16"
1/2"
1/2"
7/8"
F-3
Front Motor Clip M
3"
13/16"
F-14
3 5/8"
1 7/8"
1/16" Sq. Bamboo
F-15
3/16"
F-9
F-8
F-10
3/16"
F-15
1/8" x 7 5/8" Round Wood
1 7/8"
3 5/8"
F-14
13/16"
3"
No. 5
ELEVATOR
2 1/4"
1/16"
13/16"
3/16"
3/32"
F-14
2 15/16"
1/16"
15/16"
3/32"
1/8"
1/4"
1/16"
3/32"
F-15
ELEVATOR FORMERS. Make 2 each.

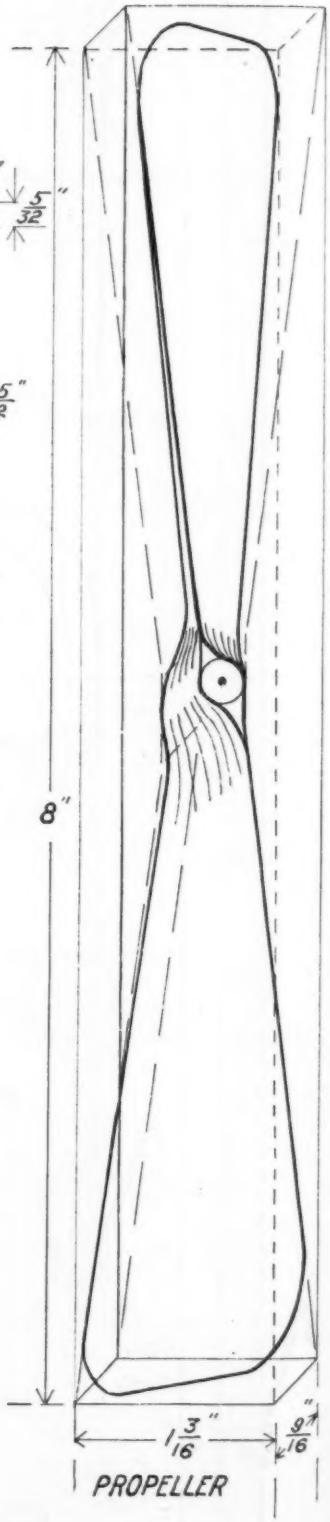

X
Propeller Hanger
Joins at X
12"
N
1/8" Cut out
3/8"
5/8"
5/8"
1 3/8"
F-8
31/32"
23/32"
2 1/4"
1/8"
3/16"
F-5
9"
5/8"
7/8"
2 1/8"
F-7
11/16"
15/16"
2 7/16"
F-6
17/32"
3/4"
F-10
3/16"
9/16"
2 31/32"
1/4"
F-9
1/16"
5/16"
1 5/16"
Head Rest
Rear Hook
Propeller Shaft
25/32"
S Hook
Rear Motor Clip N
LEADING EDGE
Make 2
1/16"
1/4"
1/8"
No. 6




WING RIBS. Make 2 each.

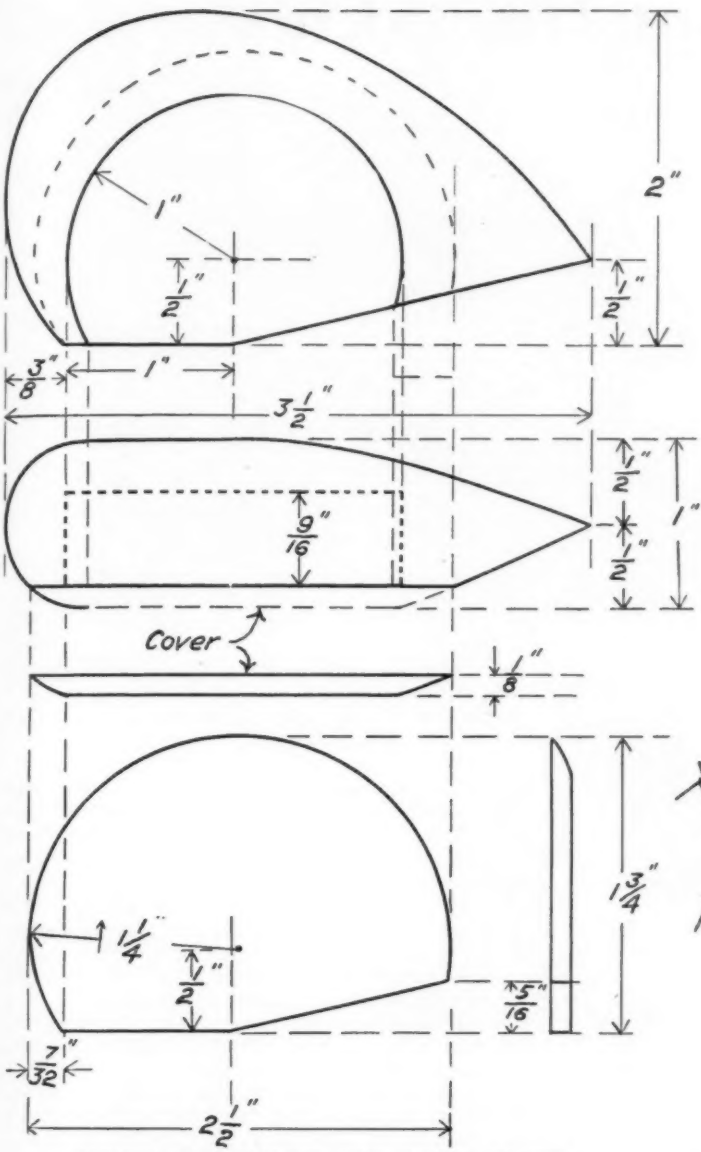



LANDING GEAR STRUTS

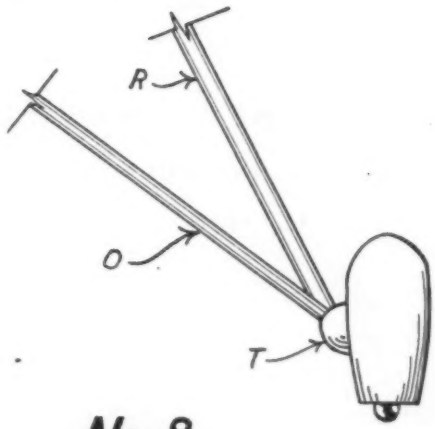



PROPELLER

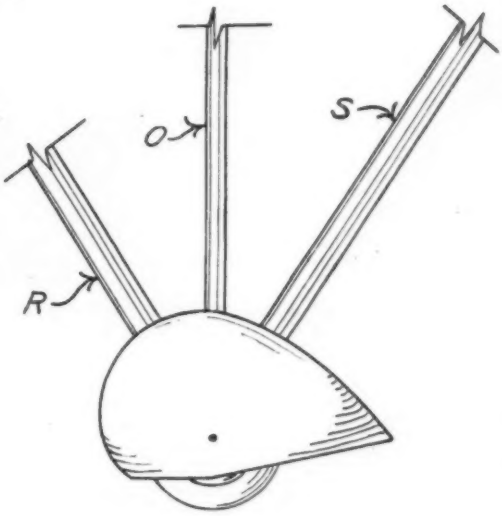
No. 7



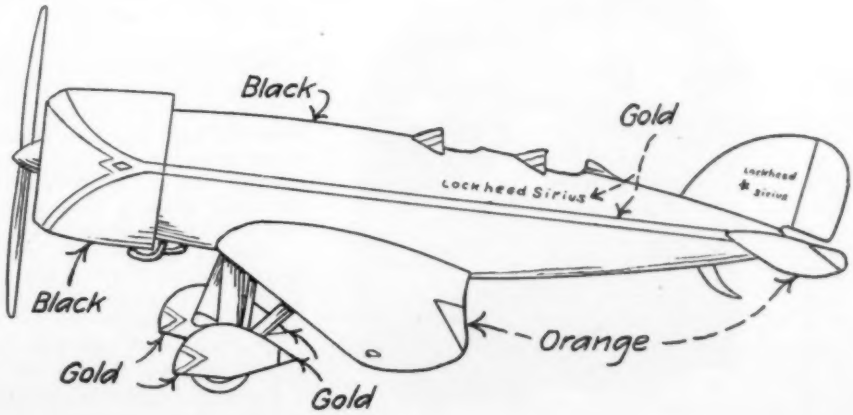

WHEEL STREAMLINE AND COVER PLATE




No. 8

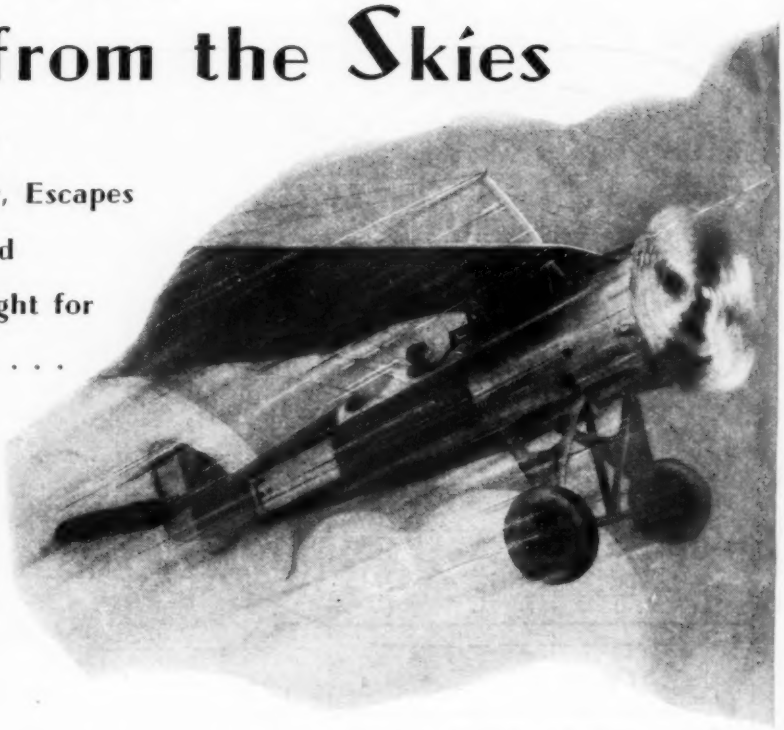



ASSEMBLY OF LANDING GEAR



# The Avenger from the Skies

**Dan, Charged with Murder, Escapes to the Hills to Find That He Must Again Fight for His Life Against. . . . . .**



*LEARNING to fly against his father's wishes, Dan Carter secured a position as stunt flyer with the Dawnart Films. He has a hunch that his father, "Dad", is in trouble and he decides to try to help him. Returning to Boomer Valley and hearing his father is in financial difficulties, Dan goes into town to see what he can find out.*

*Dan gets into a fight over another boy, Tom Calloway, and they are both arrested. Next day they appear before Simons, the judge (who is also the mayor) and Dan is fined $500. The other boy refuses to tell Dan what his sentence is.*

*Later, Dan breaks out of jail but Tom will not go with him. Dan hangs around and hears Simons force Tom to blow up the bank as the price of his freedom.*

*When the explosion occurs, Dan is discovered on the street and is pursued by a mob. He escapes to his plane and at daybreak sets out to find Tom.*

*He locates Tom on his pony and about the same time, spies a posse and Simons riding after Tom, Dan tries to warn Tom. Tom's pony stumbles and falls and Tom is forced to hide in a crevasse in the canyon wall. Dan lands and after a hazardous attempt to reach Tom, they both regain the plane and outwit Simons.*

*Dan takes Tom to a safe hiding place. He then flies to Hollywood where he learns that the Dawnart Company are going on location in Boomer Valley to shoot a war picture.*

*When the picture starts, Dan discovers that a new flyer named Harvey has been hired to take part.*

*They stage a battle in the air and just as Dan has succeeded in shooting down all the "enemy" planes, the new flyer, Harvey, dives at Dan and forces him into a tail spin.*

DAN hardly knew how many things he did with his feet and hands. He remembered the first instructions he had ever received. When in a bad spin and not sure what to do, do something. Dan did everything.

He kicked the rudders and swung the ailerons. He had spun down for more than 500 feet when somehow he discovered the right combination. There was a sickening side slip, then the plane leveled off. With an all-gone feeling inside, Dan spiralled for a landing.

Steinfeldt ran toward him, shouting.

"That was a pip—a pip! Best air stuff we've ever had. That new man knows his stuff!"

So that was all the director had got out of it? To his ground mind, the mere fact that the boy "ace" had missed a bad crash only by an eyelash did not mean anything. He slapped Dan's back and a minute later when Harvey brought his Fokker to the field, he rushed over and Dan saw him shaking hands with the new man.

Dan did not say a word. He felt rather limp and his knees kind of wabbled, but he let the incident pass. He had got a little bit of added glory that he had not asked for, and even Grover, the "hero," unloosened for once and said, "Great stuff, Dan."

Tom, who had witnessed the mimic warfare from his high place on Minion Mesa, sensed the truth more nearly than had Steinfeldt or the others. When Dan dropped down on the mesa for a few minutes that afternoon, the other boy was trembling and unusually pale.

"Gee! I thought you were a goner," he said, trying to smile. "If—if anything happened to you I guess it wouldn't make much difference to me about gettin' well."

"Aw, buck up," said Dan gruffly, trying to pretend that he had not got the other boy's meaning.

The same longhorns were grazing in the pocket canyon that afternoon. No others had been

By
LAURENCE DONOVAN

Down came the blimp!

brought in. Tom said some of the Mexicans had returned. He had heard voices below. They had stayed for only a short time, for he had heard horses galloping away.

Dan came out of the chuck tent in the evening and wandered around the lot. For a little while he watched the filling of the blimp. This was the small German "sausage" balloon that he knew was to be used in the next day's scenes. This would be an easier stunt than the battle with the Fokkers. Dan's gun would be loaded with "fire" bullets and he was to "shoot down" the observation blimp. Easy stuff.

It was dusk, rather dark in the valley, and Dan for a minute did not recognize the two figures that were standing off to one side near the bluff when he was walking back to the bunk tent. But Dan had a keen ear for voices.

"Now what do you suppose that means?" he said softly to himself.

The two men talking were Simons, the mayor of Crosscut, and Harvey, the new flyer.

The new flyer had recently been employed by the Dawnart Company. That stunt of his during the battle had been no accident or misunderstanding. Dan had been pretty sure of it at the time, but it was difficult to accuse a fellow flyer of deliberately attempting his life.

Later in the evening Dan was pulling off his leather leggings, preparing to slip into his bunk when he thought he heard some one walk across the lot toward the spot where the planes were drawn up in line. Hastily rebuckling the leggings, he slipped out and went toward the planes.

The "Eagle Longhorn" stood at the end of the line. Its shape was like the shadow of a great bird roosting under the starlight. Dan walked softly, passing around the nose under the propeller.

Something clinked. It sounded like a metal object striking a wire. Then Dan saw a tall, dark figure bending over the tail of his monoplane, tinkering with something about the elevators.

In two quick leaps Dan reached the other man. His fist swung on the second jump and caught the prowler under the ear. He staggered, but did not go down. Twisting around he grabbed at Dan's arms, blocking his next blow. Then together they rolled to the ground.

SOMEBODY passing nearby shouted. Dan felt his head rammed into the hard ground. A fog went over his eyes and the earth spun around under him. Almost knocked out, an old scuffling trick came to mind. Dan doubled his right leg bringing his knee up sharply into the man's stomach. The man groaned and loosened his hold.

Dan squirmed from under his antagonist and hooked one arm around his neck. His right hand was free and he got in one good, solid punch that crashed on the man's jaw. The man quivered, grunted and lay still.

"What's this? What's this?"

Steinfeldt with a pocket flashlight and three or four others of the company came running around the plane. The circle of light fell on the face of the man Dan had knocked out. Dan knew who it would be before the

others realized the flash showed up Harvey's dark face.

Only Dan's intervention prevented Harvey, when he returned to consciousness, finding himself the target for summary action on the part of the other flyers in the company. Reluctantly, at Dan's request, they permitted Harvey to get off the lot.

One of the monoplane's rudder wires had been loosened. Whatever Harvey had intended to do had not been completed.

Dan was tempted to tell all that he knew when his Dad unexpectedly arrived at the Dawnart lot next morning. Dan thought that Dad looked older than when he had talked with him a few days before. He had talked to him by telephone several times, after the film company had set up and run a temporary line to the town, but he had kept quiet about Simons.

Dan had it in mind to work this thing out himself. He knew his father was surrounded by enemies, and that his own foreman was in the pay of Simons. But Dad was honest and trustful of others. It would be hard to convince him of the truth so Dan kept quiet.

"'Spect I'll hang 'round awhile an' watch some of your tricks that you call workin'," remarked Dad, after he had settled with Steinfeldt in the matter of using some of the longhorns. "'Course it's easy compared to forkin' a mean bronc, but I heard you made your flyin' machine buck yesterday just like a hoss."

The Vickers gun was belted with "fire" bullets when Dan took off for his attack on the German blimp. The sausage-shaped balloon had been sent up a few hundred feet and it lay in a position where the action could be readily filmed by cameras located on the high, jagged bluff at the side of the valley. Two dummy figures were fastened to the edge of the basket under the balloon.

McKelvie, in his Fokker, was to make a play at trying to shoot Dan down, was to be "shot down" himself, and then Dan was to send a stream of "fire" bullets into the gas-filled bag. It would collapse and fall, apparently in flames. That same blimp had been shot down several times and was pretty liberally patched.

Dan engaged the McKelvie Fokker a few hundred feet above the blimp. Once again they pulled their "crash" stunt, and Dan wondered what Dad thought of that one. To make it more thrilling, Dan pulled into a loop after he had hurdled his plane over the Fokker, while McKelvie was doing his "falling leaf" with the smoke streaming from his cockpit "pot." Dan wanted to give Dad an eyeful.

Coming out of the loop, Dan dived straight down on the bulging, swaying body of the balloon. It was a broad target for his gun, and when he was still a couple of hundred feet above, he pulled the trigger. The smoking "fire" bullets streamed into the defenseless bag. Smoke began pouring up. Slowly the balloon collapsed and began falling, as Dan pulled himself out of the dive.

THE monoplane was only about 300 feet from the edge of the bluff now. Dan had purposely banked in that direction to keep in the eyes of the cameras. To one side of the cameraman a small group of visitors had gathered. Stretching away in the other direction, the face of the bluff was broken by numerous deep crevasses.

When suddenly a jagged hole appeared in the plane's wing, Dan was not sure what had happened. But when another hole appeared, and then the windshield cracked, Dan knew the answer. His eyes explored the face of the bluff.

There it was. A puff of white smoke. Then another one.

Another bullet whined off the rim of the cockpit. Dan located the puffing smoke in a crevasse between two towering black rocks. Kicking right rudder, he pushed the stick forward, banking until he had the crevasse in the sight rings of the Vickers.

Perhaps Dan did not remember at the moment that the "fire" bullets were the real thing. He thought he would give the rifleman a good scare with his tracers. He pulled the trigger and a sizzling streak leaped from the plane to the rocks. Then Dan pulled out of it in time to clear the bluff and come volplaning to the lot.

"Yessir! Deader'n a mackerel! One of them tracers bored 'im!"

The excited cameraman thus conveyed the information of what he had found in the crevasse on the bluff.

"Harvey, huh?" questioned Steinfeldt. "Well, he sure had it comin'!"

"An' you say he was shootin' at the flyin' machine with a rifle?" asked Dad.

Dan pointed silently to the bullet marks on the wings and to the shattered windshield.

"Had a right to defend yourself," declared Dad, but his forehead was creased in a worried frown. "Still, I wish it had happened somewhere else than in Boomer Valley. This Sheriff Dozer ain't so long on the law, but I've got an idea there'll be trouble."

Dan had no doubt on that score. He was much more sure of it than his father. And Dan did not want to be locked up again in Crosscut. If he were going to get at the bottom of the plot to steal his father's ranch and round up the cattle rustlers, he would have to be free.

Dan was sorry he had killed Harvey. To be sure, Simons' hireling undoubtedly meant to shoot him down, but he had acted in a hot-headed fashion. There was too much at stake to have put himself in a bad position. He had no thought but that the killing of Harvey could be easily defended, but he had learned many things concerning the one-man town of Crosscut in the last few days and he was not so sure.

But while he was debating over whether he should fly at once to Minion Mesa or go elsewhere, horses' hoofs pounded down the trail from the town. A blustering, red-faced man slid off one of the horses.

"Which one's Dan Carter?" he demanded, bloodshot eyes sweeping the circle of Dawnart actors.

No one spoke. The sheriff's eyes lighted on Dan.

"Guess you're him, huh?"

"Yes," said Dan. "Why?"

"DON'T be gettin' uppity young fellow," boomed Sheriff Dozer. "You're charged with the cold-blooded murder of a peaceful citizen, Stanley Harvey. Stick out your hands."

"Say, you can't do——"

Steinfeldt started forward.

An ugly looking six-gun jumped into the sheriff's hand. Some of the men on the horses drew their weapons.

"You keep outa this—'lowed there might be trouble an' we're all set for it. 'Sides that, you can pack up your danged movin' pitcher layout an' git outa this valley. You've been disturbin' the peace an' you brought on this here murder. You got 'til sundown to be on your way or the whole kit an' caboodle o' you'll go to jail."

Steinfeldt stepped back and silenced the muttering among Dan's fellow flyers. He saw the cards were stacked against him and that there was nothing he could do.

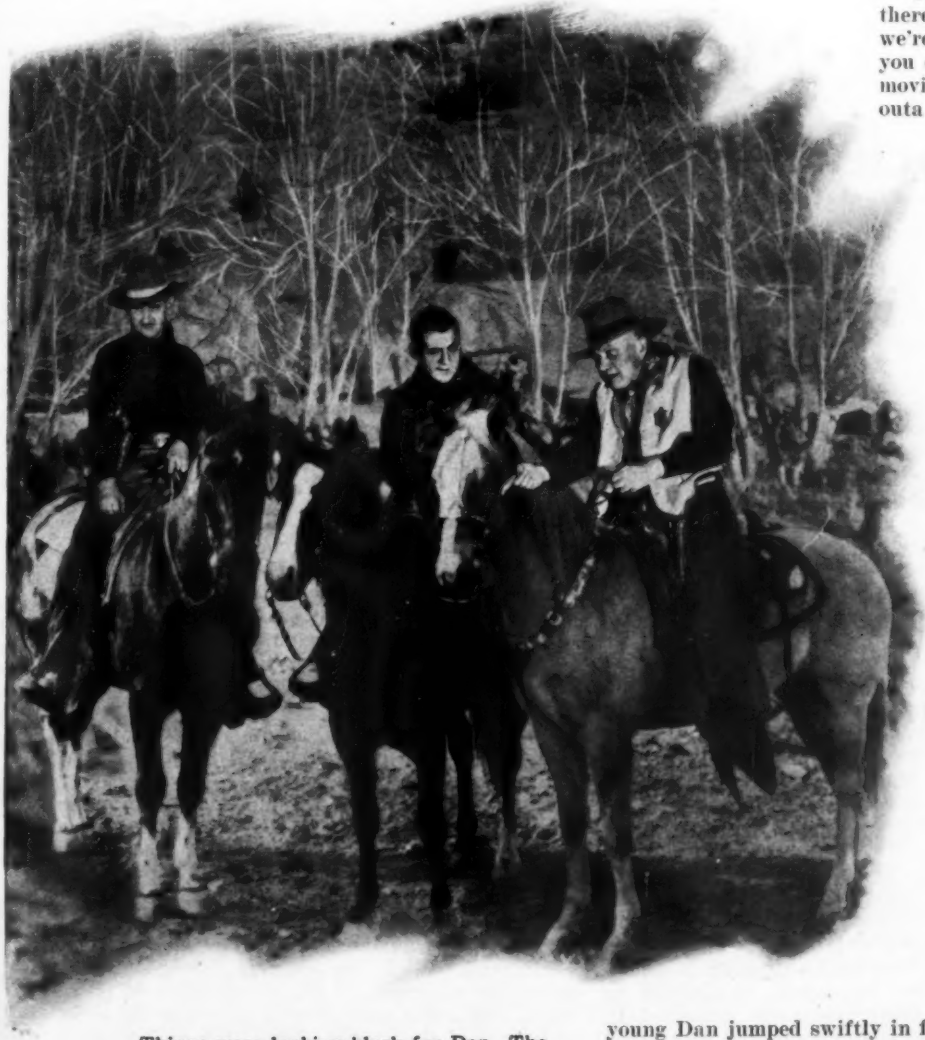
Dad, who had remained silent, stepped up to Sheriff Dozer. He seemed to be making an effort to control his voice.

"How about a bond, sheriff?" he asked. "'Course I'll sign one right away and——"

"You keep outa this, Dan Carter," rapped out Dozer. "Your bond ain't worth nothin' an' you know it. We aim to rid this valley of lawless rackets like this here movin' picture stuff."

Dad's face was like chalk. His hand moved toward the butt of his gun. But young Dan jumped swiftly in front of him.

"Don't do it, Dad! You always told me when things were the worst to sit tight. Be- (*Continued on page* 52)



Things were looking black for Dan. The others, wonderingly, waited for developments

## The History of Model Building

*THE record of Prof. T. N. de Bobrovsky, an experimental scientist and for sixteen years a professor of aerodynamics, establishes him as a notable authority on the subject of which he writes.*

*He has been working with models for more than twenty years and lectured in Europe for some time. He was president of a model and gliding club for several years, has constructed hundreds of scientific models and a number of gliders, and has published innumerable books and articles on the theme.*

*With his helicoplane, he won two first prizes and made two world's records, which are still retained by him. During the World War he was chief engineer of the Austro-Hungarian Flying Corps.*

*At present Prof. de Bobrovsky is in charge of the wind tunnel and is technical adviser with the Tubular Air-Craft Corporation of Secaucus, N. J.*

THE EDITOR.

# MODELS As Scientific Aid to Aviation

By

**Professor T. N. de BOBROVSKY**

CAN serious and exact tests be made with the small flying model? Can they lead to results? These are questions brought up time and time again in regard to model flying. In the eyes of the public, flying models are nothing but an interesting and modern toy. The majority of aviation experts disregard the model entirely, others find the flying model merely a good example to use in instructing the younger element in aeronautics, while a few experts consider the model a great aid for serious, scientific research. This unfavorable attitude of the majority of flying experts toward the small model is not to be wondered at, as I know several designers of aircraft who even disbelieve results shown by a wind tunnel model.

Every day we, in our laboratories, hear the statement, "Oh, yes, this little model flies beautifully but try to build it on a large scale and see what happens!" It is this wrong attitude, and the belittling of flying model tests, that have prompted this series of articles dealing with the use of models as an aid to aviation. These articles will be illustrated with protographs and sketches of scientific model tests heretofore unpublished.

I have been asked if it is worth while to write of scientific flying models. It is worth while. Thousands of boys are building models in this country and we know that the inventive genius is developed in a boy's mind around the ages of fourteen to nineteen, so, therefore, it is imperative that he should, in addition to building models copied from blueprints published in perodicals, also give vent to his ideas and learn that model tests, properly conducted, lead to big results.

Anyone who makes a statement to the effect that the proper behavior of the small model does not prove that the same thing would be practical on a large scale does not know, or forgets, that today's airplanes are the result of the small model.

The small model has its own interesting history. A flashback in the history of the model can be placed in three groups up to the year 1910. Just as oftimes happens today, the youth and inventors of yesterday did not have enough funds to complete their inventions on a large scale. Therefore, in order to demonstrate their ideas to secure financial backing, they were forced to use the small model, which is so neglected and belittled by the designers of today.

IN the first group, we find those inventors who experimented with flying models from the days of Leonardo da Vinci (1452-1519) up to the year of 1860. Models made in this era are far more elementary than the most primitive flying model and there is no proof that any of them made an actual flight.

In the second group, we have those who experimented with flying models from 1870 up to the time of the first flight by the Wright brothers (1903). When the French Aero Club moved to more spacious quarters in the early nineteen hundreds, they found among their dusty, half-forgotten records an unopened package addressed to the one-time president of the club, M. Giffard, and bearing the name of the unknown sender as M. Penaud. While the pioneers throughout the world feverishly searched for the possibilities of mechanical flight, this dusty package was opened in the secretarial chambers of the French Aero Club and found to contain startling information. It was found, after systematic investigation of its (*Continued on page* 58)

By
HI SIBLEY

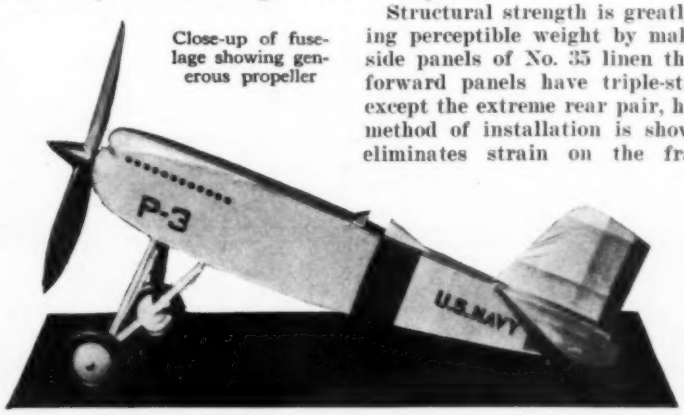
The navy fighter takes to the air

# A Trim, Fast-Climbing Navy Fighter

## How to Build a Good Flyer with Attractive Devices—Simulated Engine Noise, Automatic Rudder and Elevator Controls

THIS little ship is just about perfect in design, finish and performance, and a splendid model for good craftsmen to copy. It has been developed with painstaking care by Robert W. McCorkle, of Monrovia, California, himself an aviator as well as expert in building and flying model planes. Young McCorkle has gone thoroughly into the study of aerodynamics and the ships he builds fly precisely as he intended they should fly.

Two unique features have been incorporated in this smart little fighter. As all model flyers know, the rudder must be turned slightly to counteract the lateral pull of the propeller in flight and consequently, as soon as the rubbers are unwound, and the plane enters a glide it comes to earth in a tight spiral. McCorkle has worked out an arrangement whereby the rudder is kicked back to normal as soon as the motor runs down, bringing the ship down in a graceful straight glide. This device is illustrated in the detail drawings.




Close-up of fuselage showing generous propeller

Another novelty is the arrangement for reproducing the high-pitched drone of a racing motor. It is simple. The escapement balance-wheel of an alarm clock is soldered to the propeller shaft; the notched rim of the wheel plays against a strip of celluloid which is secured inside the fuselage in such a manner that it drums against the tight fabric of a forward panel. The effect is sensational.

Primarily this craft is designed for rapid climb—estimated at about 75 feet in ten seconds. This performance is made possible by a ten-inch propeller with generous width of blade powered by twelve strands of 3/16″ flat rubber. Fourteen strands have been used, but are not recommended. For a five-ounce model of only 26″ wing span its performance is exceptional.

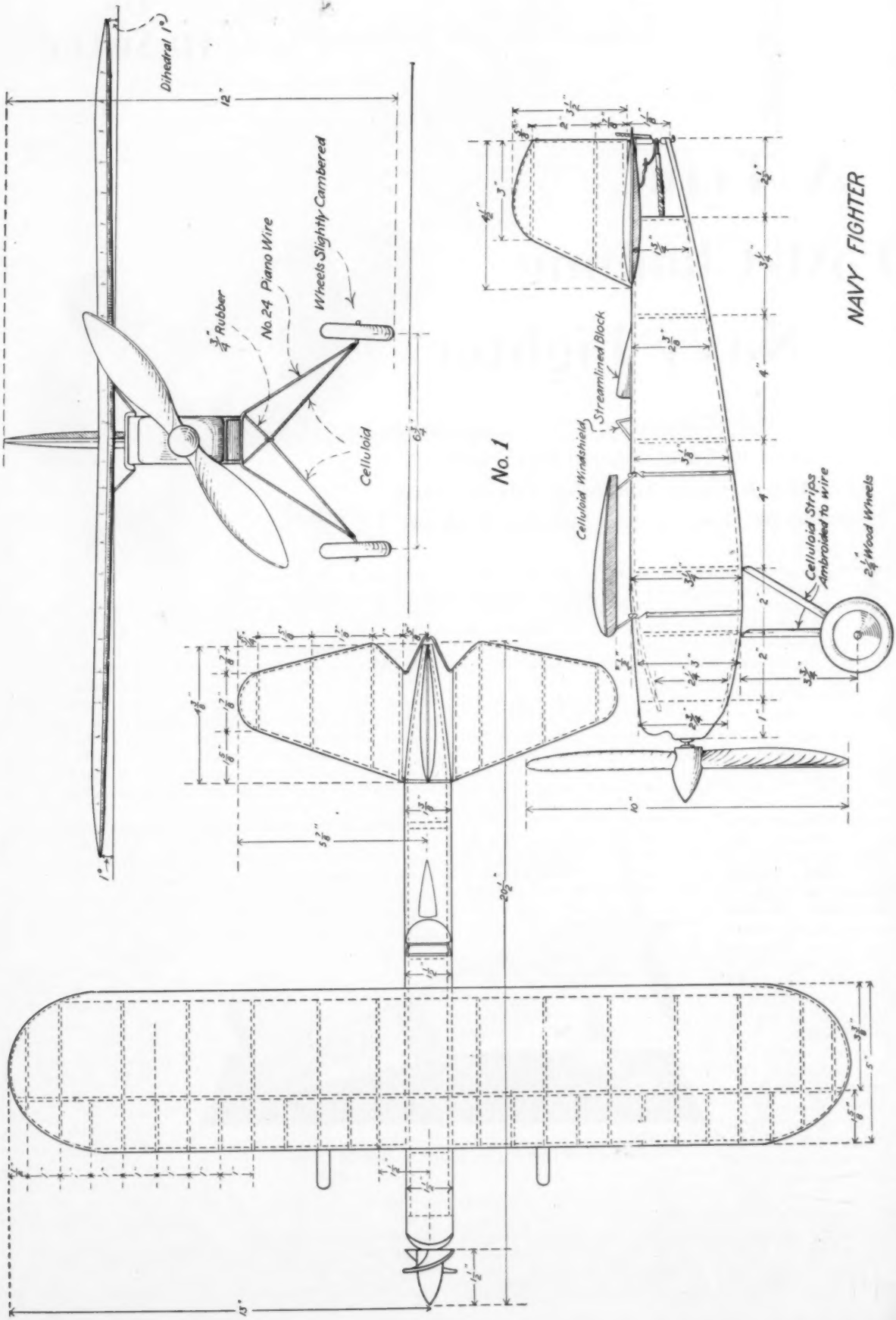
There are no really difficult kinks in constructing this fighter, Bob McCorkle assures us, if one has had some experience building successful commercial types and applies his best skill. The best way to begin is to lay out fuselage profile in pencil on a clean board, and drive in brads along the outline to hold the longerons to the proper curve while ambroid is hardening at the strut joints.

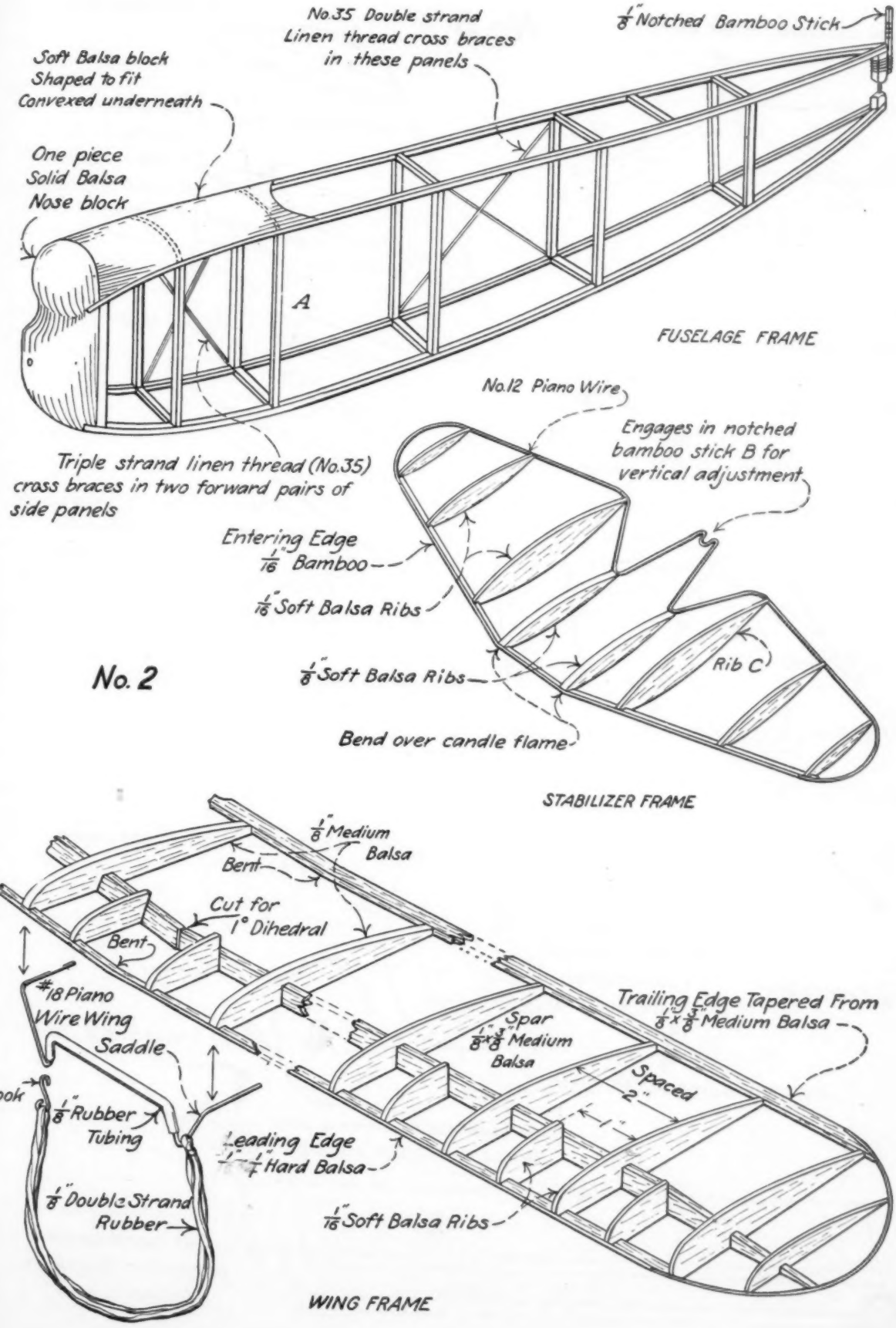
Structural strength is greatly increased without adding perceptible weight by making cross braces in the side panels of No. 35 linen thread. The two pairs of forward panels have triple-strand braces, all others, except the extreme rear pair, have double strands. The method of installation is shown in the sketch, which eliminates strain on the frame while ambroid is hardening.

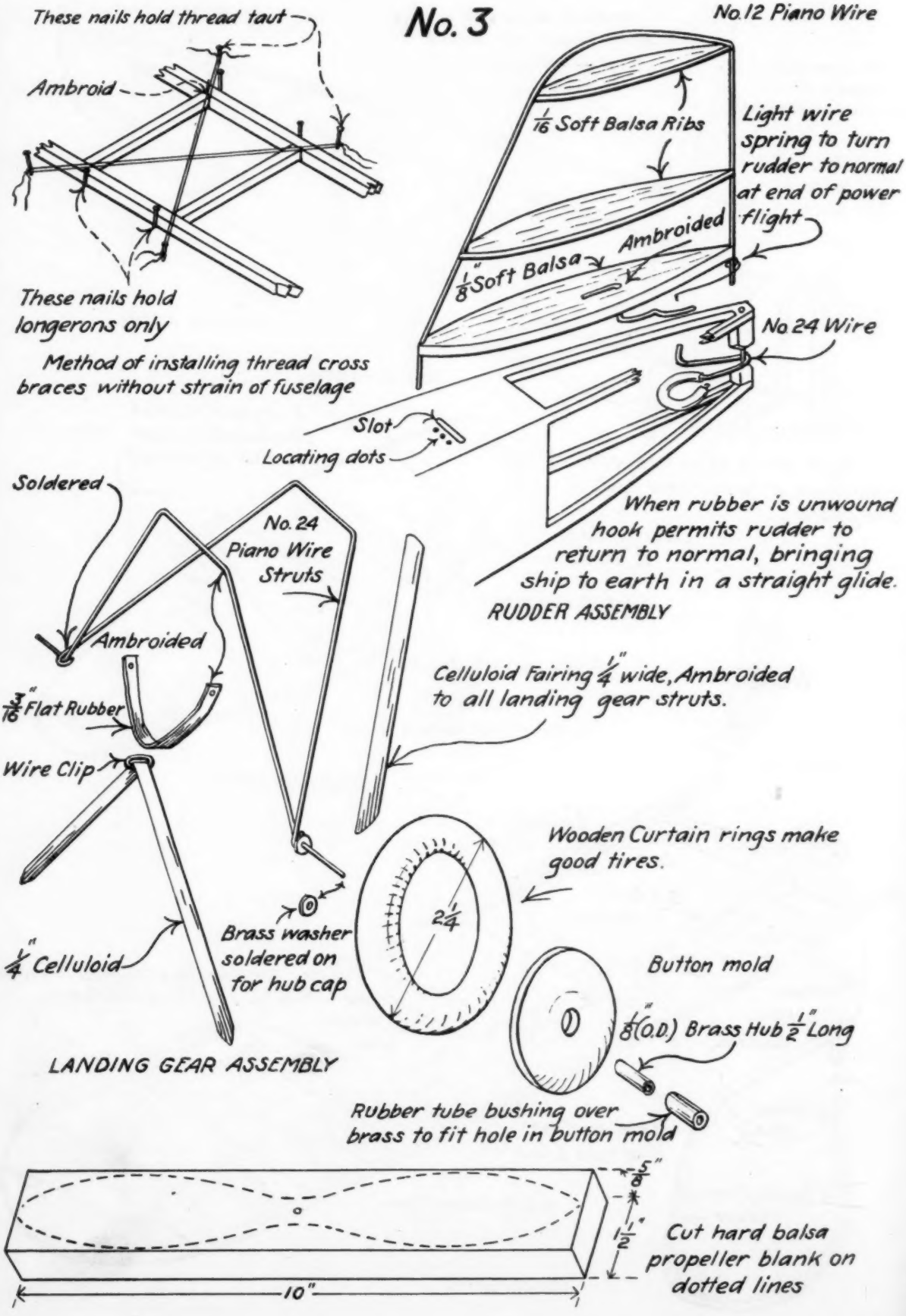
In case ambroid sticks to the board, the frame can be loosened by slipping a razor blade under the joints. Note that the upright member at the apex of the tail appears as one piece of balsa which is cut away partially for the rear hook, but this actually is built up of two upright halves of 1/4″ x 1/8″ hard balsa, one piece in each side-frame which are ambroided together when the fuselage is assembled.

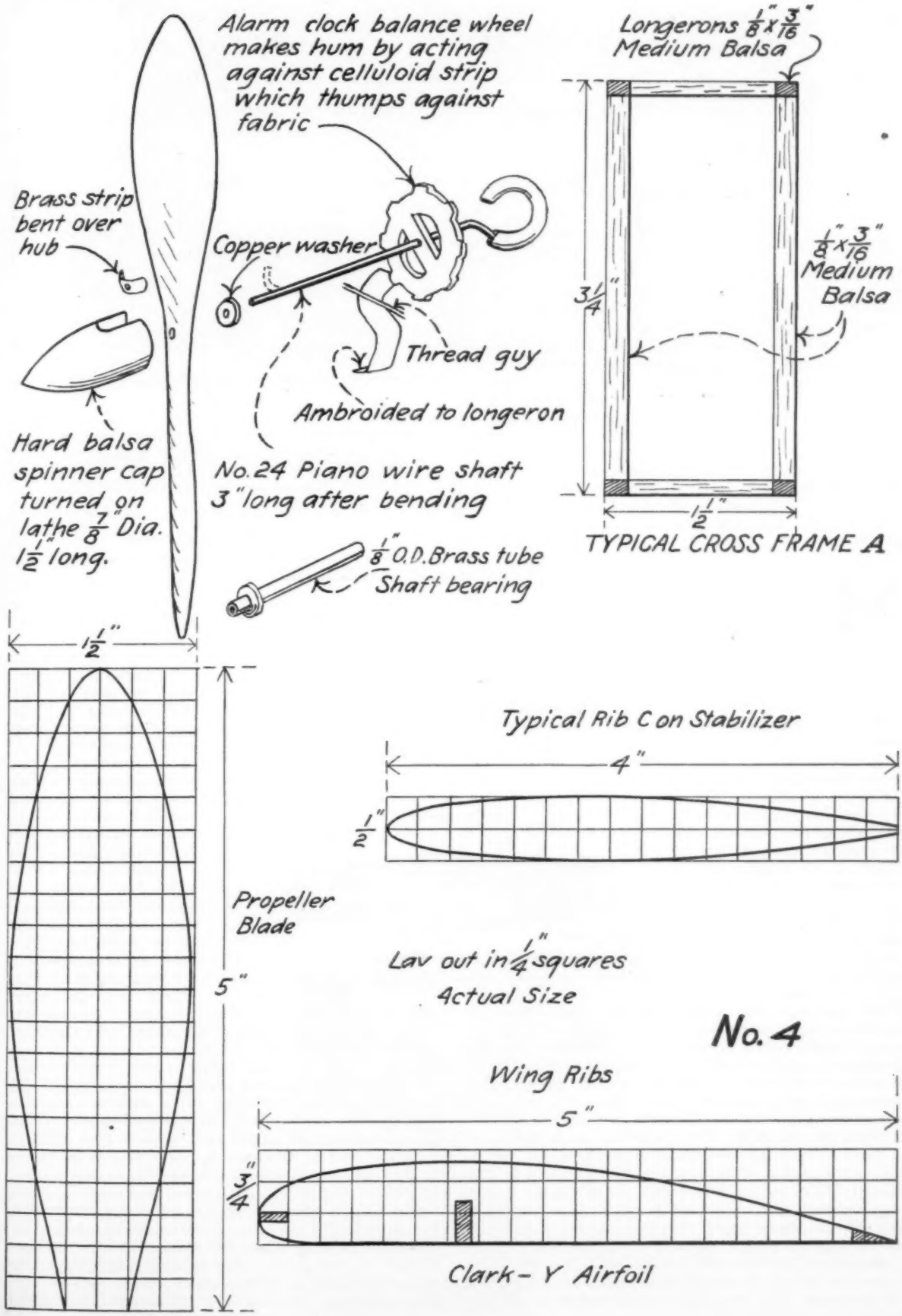
The two completed side frames are joined together by means of the cross struts along top and bottom of fuselage, the nose block ambroided (*Continued on page 57*)

See Plans on Pages 36 to 39


NAVY FIGHTER
No. 1
Dihedral 1"
12"
Wheels Slightly Cambered
No. 24 Piano Wire
Rubber
Celluloid
Streamlined Block
Celluloid Windshield
Celluloid Strips Embroidered to wire
2½" Wood Wheels
10"
5"


No.35 Double strand Linen thread cross braces in these panels
1/8" Notched Bamboo Stick
Soft Balsa block Shaped to fit Convexed underneath
One piece Solid Balsa Nose block
A
FUSELAGE FRAME
No.12 Piano Wire
Engages in notched bamboo stick B for vertical adjustment
Triple strand linen thread (No.35) cross braces in two forward pairs of side panels
Entering Edge 1/16" Bamboo
1/16" Soft Balsa Ribs
No. 2
1/8" Soft Balsa Ribs
Rib C
Bend over candle flame
STABILIZER FRAME
1/8" Medium Balsa
Bent
Cut for 1° Dihedral
Bent
#18 Piano Wire Wing Saddle
Hook
1/8" Rubber Tubing
1/8" Double Strand Rubber
Leading Edge 1/4" x 1/4" Hard Balsa
Spar 1/8" x 3/8" Medium Balsa
Trailing Edge Tapered From 1/8" x 3/8" Medium Balsa
Spaced 2"
1"
1/16" Soft Balsa Ribs
WING FRAME


No. 3
These nails hold thread taut
Ambroid
These nails hold longerons only
Method of installing thread cross braces without strain of fuselage
No. 12 Piano Wire
1/16 Soft Balsa Ribs
Light wire spring to turn rudder to normal at end of power flight
1/8" Soft Balsa
Ambroided
No. 24 Wire
Slot
Locating dots
When rubber is unwound hook permits rudder to return to normal, bringing ship to earth in a straight glide.
RUDDER ASSEMBLY
Soldered
No. 24 Piano Wire Struts
Ambroided
3/16" Flat Rubber
Wire Clip
1/4" Celluloid
Brass washer soldered on for hub cap
Celluloid Fairing 1/4" wide, Ambroided to all landing gear struts.
Wooden Curtain rings make good tires.
2 1/4
Button mold
1/8" (O.D.) Brass Hub 1/2" Long
Rubber tube bushing over brass to fit hole in button mold
LANDING GEAR ASSEMBLY
5/8"
1 1/2"
10"
Cut hard balsa propeller blank on dotted lines


Alarm clock balance wheel makes hum by acting against celluloid strip which thumps against fabric
Brass strip bent over hub
Copper washer
Thread guy
Ambroided to longeron
Hard balsa spinner cap turned on lathe 7/8" Dia. 1 1/2" long.
No. 24 Piano wire shaft 3" long after bending
1/8" O.D. Brass tube
Shaft bearing
1 1/2"
Propeller Blade
5"
Lay out in 1/4" squares
Actual Size
Longerons 1/8" x 3/16" Medium Balsa
1/8" x 3/16" Medium Balsa
3 1/4"
1 1/2"
TYPICAL CROSS FRAME A
Typical Rib C on Stabilizer
4"
1/2"
No. 4
Wing Ribs
5"
3/4"
Clark - Y Airfoil

# A Course in Airplane Designing

## By Mastering This Valuable Course, the Model Builder of Today Lays the Cornerstone for His Career as the Aeronautical Engineer and Designer of Tomorrow

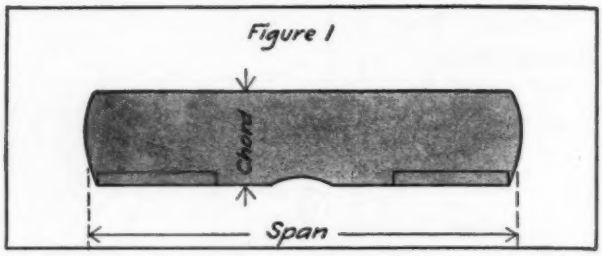
By KEN SINCLAIR

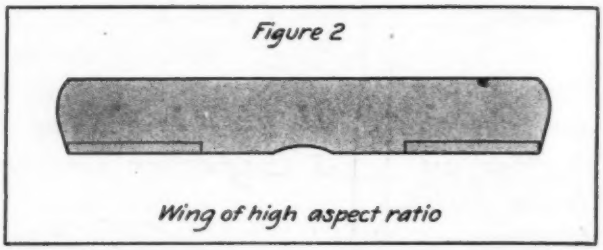
Article 5.

*IN presenting this course,* MODEL AIRPLANE NEWS *wishes to stress the fact that model building is more than a mere sport. If the builder of model airplanes learns the fundamental principles underlying airplane flight and designing, he prepares himself for a future career in the most profitable phase of aviation.*

*The policy of* MODEL AIRPLANE NEWS *is not to encourage or teach its readers to become pilots, but rather to become aeronautical engineers, designers, salesmen, manufacturers, or equip themselves for any other positions which require the training of the specialist or executive. Study this course from month to month, master it in every detail and you will gain a fundamental knowledge of the how and why of airplane design which will be second to none.*

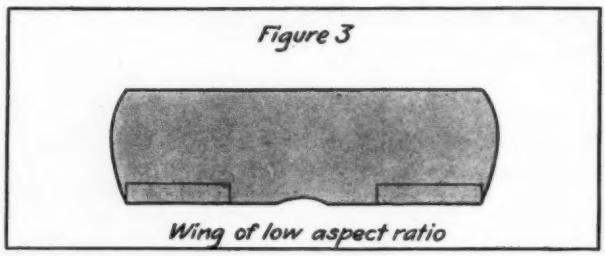
THE EDITOR.

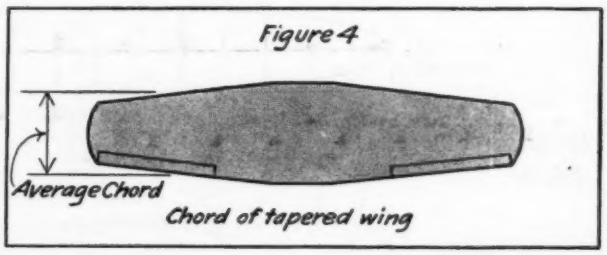



MOST model airplane builders let chance be their guide in the matter of determining the necessary wing area. To be truthful about it, there isn't much else for the beginner to do.

It is difficult to estimate the weight of a ship while it is still on the drawing board, because the skill of the builder is the deciding factor in the question of weight of the model airplane. We can draw a wing that looks large enough on the drawing board, but it may be far too large or too small for the ship when it is completed.




We may make the wing too large, making the ship fly slowly and not far, or we may make the wing too small, perhaps making the ship unable to leave the ground. I recall a ship that I designed for speed that flew quite well until we took the covering off the top of the wing between the two center ribs. This was only about six square inches of surface, yet the ship refused to leave the ground until we recovered the surface!

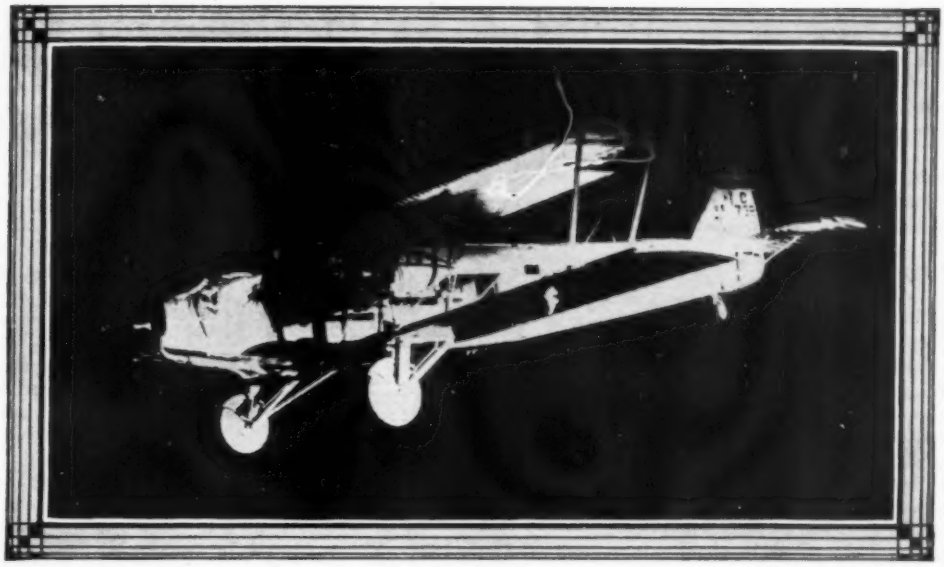
The average model builder, however, does not care to design his ship as closely as that. He wants to be sure that it will fly well, but he would rather not go through any complicated mathematics to design it as closely as the ship mentioned above. For this purpose I shall give two methods of wing area estimation. The first of these was evolved for the model builder who has not had a great deal of experience, while the second is for the use of the person who has built enough models to estimate weight accurately, plus some elementary mathematics, at least high school algebra.

Before we take up these methods it is necessary to have a good understanding of the most important terms used in wing design. As shown in Figure 1, span is the distance from tip to tip, while chord is the distance from leading edge to trailing edge, on most wing curves.

Aspect ratio is the relation between the span and the chord, expressed as a number. For instance, a wing having a span of thirty inches and a chord of five inches would have an aspect ratio of six, or $30 \div 5$. A wing having a span of fifty inches and a chord of five inches would have an aspect ratio of ten, or $50 \div 5$.

GENERALLY speaking, the higher the aspect ratio the more efficient the wing, but a wing of very high aspect ratio needs so much external bracing that the advantage of the high aspect ratio is more than offset by the added drag of the struts. You will note in the photos of the German sail planes that they have long narrow wings, meaning a high aspect ratio. The usual range for aspect ratio is between four and eight and one-half. It is usually best to use an aspect ratio of about five or six.

For rectangular wings the aspect ratio is the span divided by the chord. For tapered wings, it is the span divided by the average chord, or the square of the span divided by the area. (*Continued on page* 65)



(*Pictorial Press*)

An unusual photograph taken at 4 A.M. at Oakland, Cal., showing a Boeing Tri-Motored transport landing after a flight from Salt Lake City

# The American Sky Cadets

## Trenton, Jersey City and Elizabeth, N. J., vie for Honors in Model Activities— Philadelphia's Contest a Great Success

FEVERISH activity and suppressed excitement which had been the portion of the youthful model builders of Philadelphia for weeks, reached their climax at the first city wide meet held at the 108th Field Artillery Armory, Broad and Diamond Streets.

Long before the time scheduled for the first contest, future aviators were on the spot altering, adjusting and putting the final touches which mean so much to these small models.

The contest was for the Baby R. O. G. type and there were over a hundred entries.

As the models flew round, the interest and excitement were intense. There was the strained silence as some model approached an obstruction, followed by the gasp of relief as it missed by a hair's breadth and continued to soar—then the cheers and hand clapping as it made a perfect landing. Surely the boy who builds model airplanes today, knows thrills that no other boy can ever imagine!

In the Senior Division, first hold on the silver loving cup goes to Olaf Pedersen of the Olney Post Cadets. This post is sponsored by Olney Post 388 of the American Legion.

Pedersen's plane made a beautiful flight of one minute forty-eight seconds. Second place went to Harold Phillips of the Jones Junior High School group, with the time of one minute, forty-seven and one-fifth seconds.

The Junior Division, however, clocked up the best time of the day. William Umfried, aged fourteen, of 1210 Seybert Street, showed the real way to do things by flying his plane for two minutes, four seconds, a very fine performance.

Another fine flight which unfortunately could not count owing to a lack of wheels on the plane, was put up by Edward Propper's model. Propper is a member of the Kendrick Recreation Centre and his model stayed up for two minutes, forty-nine seconds.

This is Bob Wickham, of Lava Hot Springs, Idaho, with one of his own designed models. In the circle is the helicopter designed by himself and which, he says, flies successfully

The loving cup which the Olney Post won this time must be won three times before it is finally presented to the group.

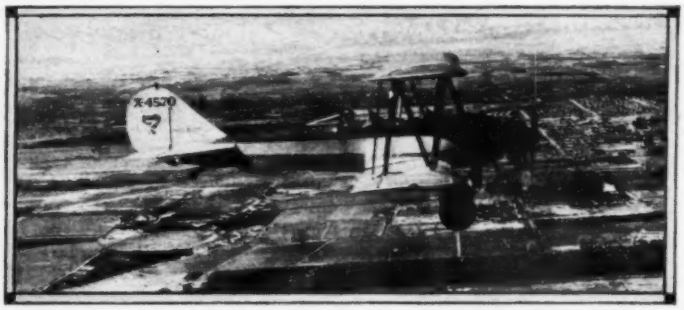
These competitions will be held monthly until the real contest takes place in May. Every one is back on the job preparing for the next meet and there is no doubt that many records will be established during these onslaughts by the Philadelphia boys.

The Playgrounds Association and the Aero Club of Pennsylvania, sponsors of the meet, are to be congratulated on the success of this first contest.

The activities of the Philadelphia boys are not

confined to this type of model.

Glider work has been taken up at the Northeast High School Aero Club where the members are busy on the construction of seven man carrying gliders. The club is under the tuition of Professor Stephen G. Hale, who has had actual flying experience.



C. A. Scheinert, Colorado Springs, Colo., submits this picture of an Eaglerock flying over his locality as the model from which the First Flying Troop will build their first scale model

An interesting device has been brought out by a member of the Jones Junior High School group. This is one step further than an ordinary R. O. G. in that it rises after being allowed to fall to the ground. This effect is obtained by moving the landing gear forward until it just holds the propeller in place, after the latter has been wound up. The plane is then released from the hand and glides to the floor. The slight impact frees the propeller, the plane runs along the ground, rises and finally makes a three point landing.

Helicopters have also been made by the boys at the Jones Junior High and some excellent results have been obtained. Helicopters and gliders do not receive the attention they deserve. Aviation engineers are working along both these lines in an effort to increase the safety factor of the airplane and every model builder ought to devote some time to both.

There is a secret hidden away in one or both of them and it is not improbable that a boy or girl may discover this secret before the engineer does. As a rule the airplane does what the model does and in general the same laws govern both.

Morton Weinberg of Philadelphia, exhibited some of his models a short time ago. These contain both flying and scale models. Among them was a Curtiss-Condor. Every detail was shown on this model which was an eighteen seater with two extra seats for the pilot and mechanic.

Two other interesting models were a Boeing Sport and a Keystone-Loening Commuter. The motor of each of these models was composed of fifty-four small pieces of wood cemented in place.

In many of Weinberg's models the controls are movable and can be worked from the cock-pit. He puts a lot of work into his models, but the results amply repay him for the trouble.

During Christmas week, the Trenton Model Plane Corps held an exhibition of models. This group is composed of boys at the Y. M. C. A. and is making good progress under the leadership of Mr. Garret, who has been interested in model planes for years and won prizes at the Interstate Fair as far back as 1922.

The N. C. 4 and the Lindbergh Monoplane carried off the second prize at the Interstate Fair in September of last year.

The Cecil-Peoli is an interesting model which has been re-designed and a third propeller added. This propeller is placed in front and just an inch and a half lower than the rear propellers. In flight this front propeller tends to lift the nose of the plane thus making possible a much longer flight. The wings are covered with silk and will stand a great deal of punishment without breaking..

John Powers was the winner of an indoor meet for R. O. G. held at the State Armory, while George Cox won the outdoor meet for twin pushers held at the Trenton-Brunswick Airport.

Trenton Model Plane Corps is divided in two groups, the Seniors and Juniors. Before a member is admitted to the Senior group, he must have constructed a glider, a R. O. G. with a flight of at least thirty seconds, and a twin pusher.

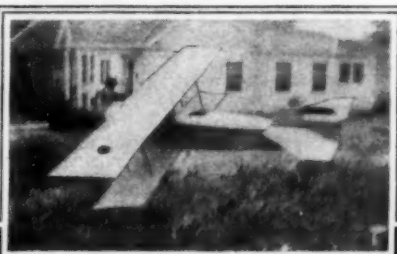
The president of the Corps is John Powers and the secretary-treasurer is George Cox.

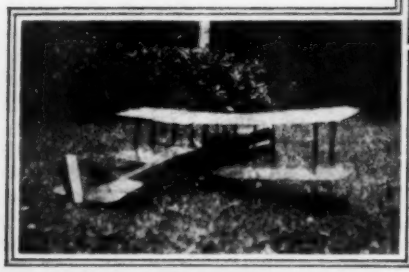
Two interesting events took place recently, the first being a talk by Mr. William Wetzel, president of the Brunswick Pike Airport. The subject was "Aviation and Flying Conditions" and great interest was aroused among the members.

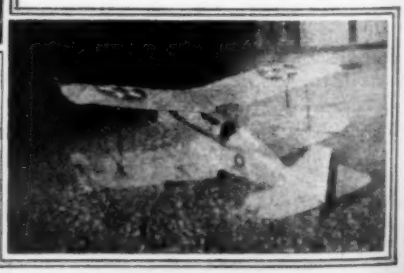
An outdoor meet followed, and was a great success. The members took their lunch with them and after the contest, inspected the Travel Air planes which were at the local airport and had the controls explained to them.

Leland Hansen of 567 So. Greenwood Avenue, Kankakee, Ill. who is a Flight Commander in his club, writes to say that their club is growing larger all the time.

The group at Summit Junior High School, New Jersey, has started an interesting idea which







Above is Carl Story's model about to land. He is from Gastonia, N. C. At the right is a scale model fighter built by Bob Whalen, Garden City, N. Y., and at the left, a model of an army DH-4 built by Clarence Sharp, Kansas City, Mo.

might well be copied by other clubs and members.

Each member has a scrap book which is to be a pictorial representation of the history of flying, starting with balloons. Each boy is trying to obtain as many pictures as possible of the different types of gliding, soaring or flying machines. Competition is keen and within a few months such a collection of pictures will be worth looking at.

Under each picture the boy writes a short description and the research work needed, for this hobby will be of great use to those who intend to take up aviation as a career and of great interest to others.

**PLANE CONTEST WINNERS**

Above is Milton Frankel, New York, first prize winner. Below Gordon Nash, Hillside, N. J., second prize winner

At the left is Raymond P. Ziegele of Chicago, Ill., fourth prize winner. Above Gordon Mendenhall, Potlash, Idaho, third prize winner

Richard E. Baum, of Mohawk, N. Y., (left) who won the fifth prize and Ralph Kennedy (right), winner of the sixth prize

The first contest was held between the M. A. C. E. and the Just For Boys Club of Newark. These are old rivals of the Elizabeth boys, but Newark was all out to win this time, because at the previous contest in June, Elizabeth carried the day.

Unhappily for Newark, Welcome Bender was at the top of his form and ran away with everything. There has been some argument as to who the three "high hats" of Elizabeth are. The final decision went to John Carman, John Brown and James Holmes. After this contest there is no doubt but that there will have to be four "high hats."

Every event was taken by Welcome Bender; to prove that he can not only build flying models, by winning the scale model contest with a very fine Curtiss-Hawk in which all the parts are movable, he also showed that he could build models which require the greatest care and patience.

The M. A. C. E. is also going to have an Aeronautical Library which Mr. Irving Levy is at present selecting. Members will be allowed to borrow the books.

The next contest is to be a free for all to celebrate the first anniversary of the Model Aviation Club.

Jersey City Y. M. C. A. is going strong with a membership of twenty-five in the club now. The leader is John Royal and the club meets once a week for a two hour period. The boys have their own workshop and on club nights great activity is shown. A number of R. O. G's. have been built and also several non-flying models.

The main project however, has been the constructing of a model of the Stinson-Detroiter. This plane, of course, was the one in which Clarence Chamberlin and Eddie Stinson created an endurance record of more than fifty hours in the air without re-fueling. This record later was beaten by two German airmen.

It also was the plane which William S. Brock and Edward F. Schlee used for their flight from Detroit to Tokio.

Great activity has been shown among the model builders in Jersey City and it is hoped that a number of contests will be held in the spring and summer.

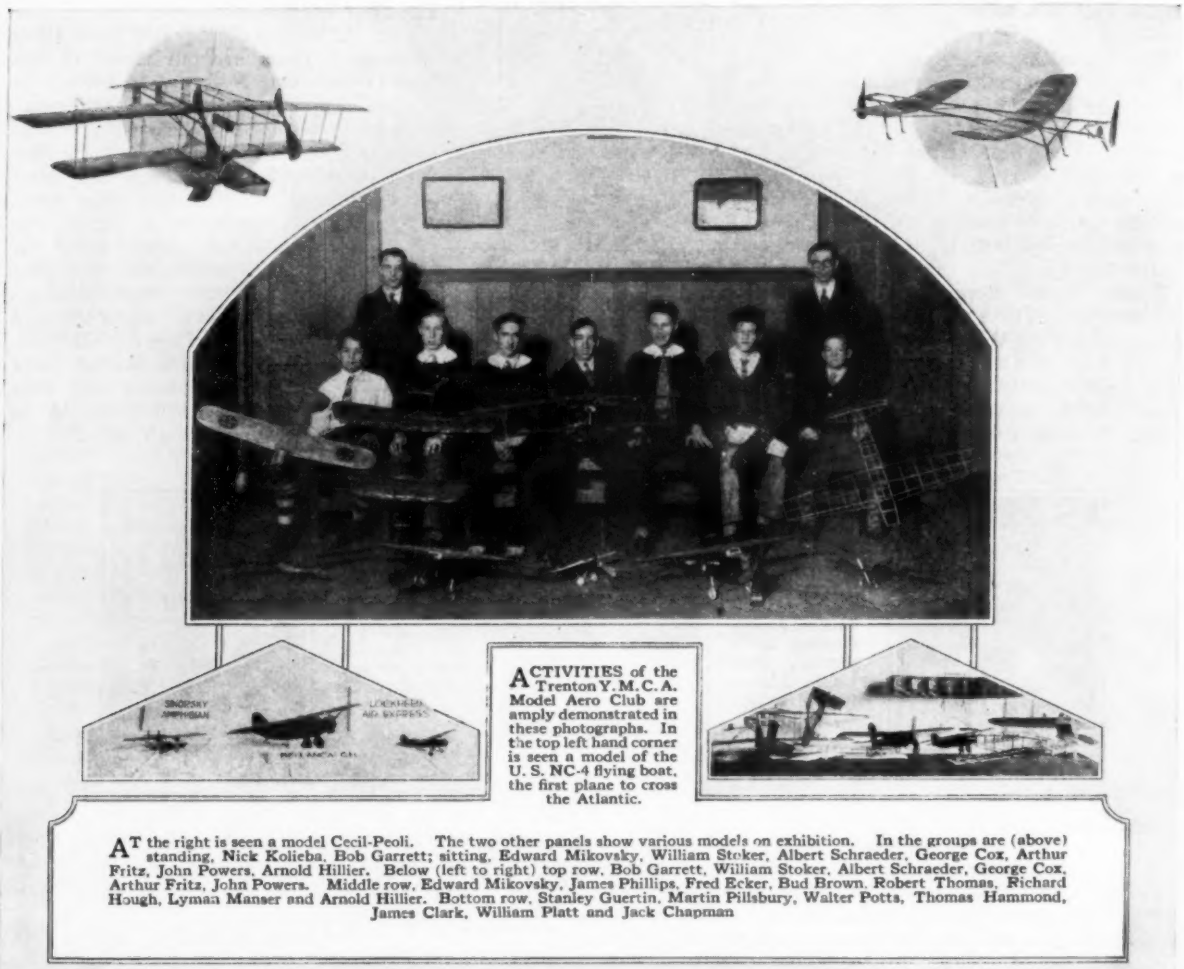
George Stewart of Grand Falls, Newfoundland, is a model building enthusiast. George is not as lucky as most of the boys in the States for he writes to say he has never seen a real plane and wishes he could see ours like the boys who live over here. In spite of this, George builds some good models.

Joe Dittrich of Madison, Ill., writes to tell of a Tri-motored Ford that he has built. This is a 7 ft. model built "just like the real thing."

There is a control stick in it to which are connected the ailerons and elevators. Joe states that when he tried out this model it ran along the ground for about fifteen feet, rose to make a beautiful flight of about fifty feet and finished up with a perfect landing.

Elizabeth, New Jersey, has entered the field of enthusiastic model makers, through the Model Aviation Club of Elizabeth. The club meets every Saturday morning in the Elizabeth Armory and an extensive program for the season has been outlined.

A crackerjack model of a Sikorsky Amphibian built by E. W. Topping, of Ashland, Ohio. The model has a wing spread of 43 inches and is built to scale



ACTIVITIES of the Trenton Y. M. C. A. Model Aero Club are amply demonstrated in these photographs. In the top left hand corner is seen a model of the U. S. NC-4 flying boat, the first plane to cross the Atlantic.

AT the right is seen a model Cecil-Peoli. The two other panels show various models on exhibition. In the groups are (above) standing, Nick Kolieba, Bob Garrett; sitting, Edward Mikovsky, William Stoker, Albert Schraeder, George Cox, Arthur Fritz, John Powers, Arnold Hillier. Below (left to right) top row, Bob Garrett, William Stoker, Albert Schraeder, George Cox, Arthur Fritz, John Powers. Middle row, Edward Mikovsky, James Phillips, Fred Ecker, Bud Brown, Robert Thomas, Richard Hough, Lyman Manser and Arnold Hillier. Bottom row, Stanley Guertin, Martin Pillsbury, Walter Potts, Thomas Hammond, James Clark, William Platt and Jack Chapman

A GROUP of boys at the Y. M. C. A. in Brooklyn, N. Y. constructing a wing for a ship

*(P & A Photo)*

MRS. LAURA B. HARNEY, who recently received a pilot's license, instructing members of the aeronautics club at a Mt. Vernon, N. Y. high school

*(P & A Photo)*

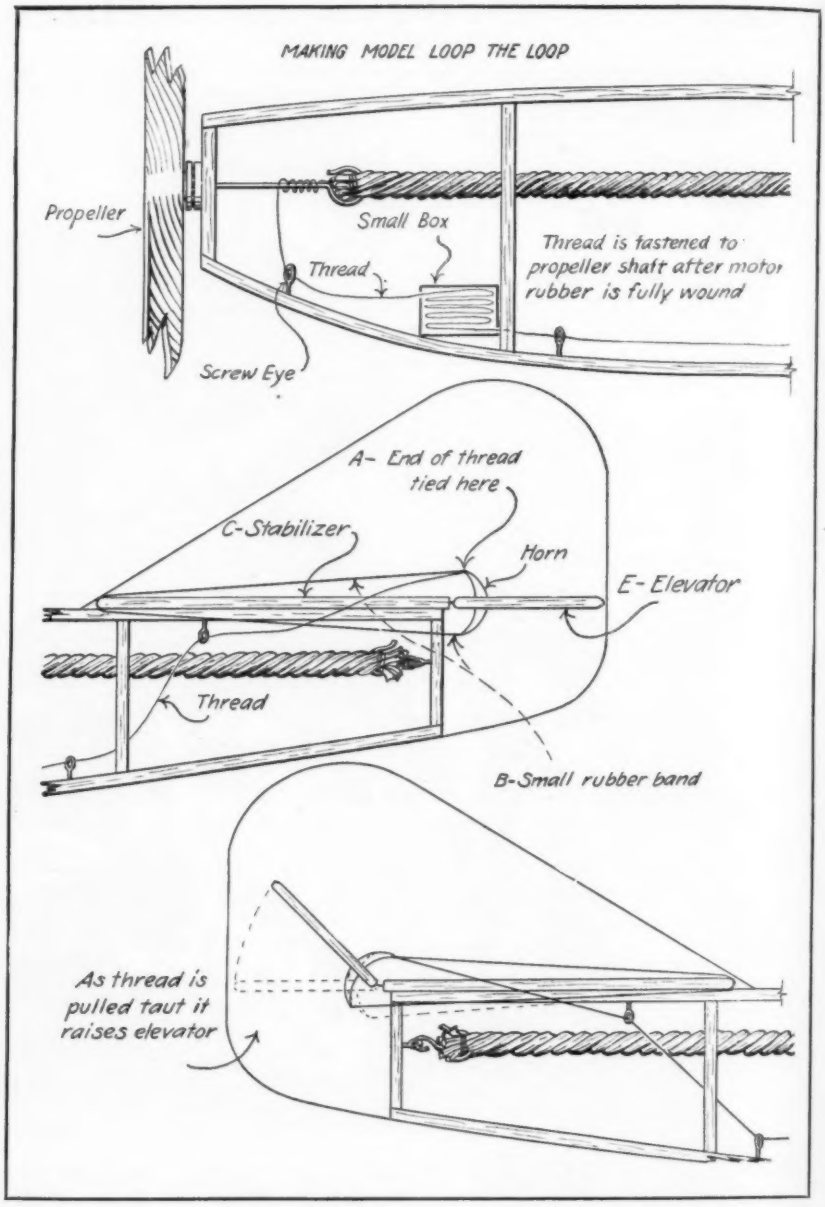
ASSEMBLING a wing at the Brooklyn, N. Y. Y. M. C. A. in the class for aeronautical construction

*(P & A Photo)*

# Hints to Model Makers

## Novel Way to Make a Model Plane Loop the Loop

By JOHN CLAUDE ROBY




THIS device permits any plane with movable elevators and a three or four longeron fuselage to loop the loop.

A very small strand of rubber is stretched from the elevators' king post to the stabilizer's king post. This is done on top and bottom. The elevator must be in a straight line with the stabilizer.

The end of a very small and breakable thread is fastened on the propeller shaft. (This is tied after the rubber motor is fully wound up.) The thread is then passed through a small eyelet screwed in the longeron. (This eyelet must be directly under propeller shaft.)

The thread is then passed through a small hole in a flat tin box, where a certain amount is deposited in the manner shown on diagram. The thread then passes through a few more eyelets and through one which is screwed on the top longeron. The end is tied on the upper king post on the elevator.

After the plane is launched, the thread is rapidly wound around the turning propeller shaft and the thread in the tin box is soon wound up. The thread then gets tight and pulls up the elevators and the plane loops. The propeller may stop half a second when the thread breaks but will soon start again. The elastic on the elevators will then bring them to their former positions and the plane will regain its course.

A few attempts will have to be made at first in order to determine what amount of thread is to be deposited in the box so that the plane will not loop just after taking off, or loop on the ground.

### To Preserve Rubber

Put a very small quantity of light auto oil on rubber strands and then pass rubber through face powder of high quality. This will help you keep your rubber in good condition when not in use.

### Keeping Ambroid

To keep a small quantity of left over ambroid, paint or colored dope for future use, replace the lid tightly on the can or bottle and place it upside down before storing away. If there is no leakage, the contents will remain in good condition.

# How to Build a 16" Model Speed Boat

## Step-by-Step Instructions for a Snappy Racer which Is Easily Built and Launched

By J. B. WIEBE

THERE are a few boys to whom the making and running of a model speed boat does not appeal. It has that unexplainable something that keeps a boy busy in his workshop during rainy and cold days and brings him out to the brook or pond on clear, warm days to experiment with the results of his labor. The making of this boat is as fascinating as any other constructional work; in fact, it is the author's experience that it proves even more interesting because it is an exact model of some of the larger boats often seen at motor boat shows and races.

The design for this type of boat is accepted by experts as the best for fast racing craft. The old-fashioned round bottom model has gone forever where speed is concerned and with it has gone the round bottom model where the same feature is the fundamental consideration.

This model was designed with the purpose of its acting as a stepping stone to the making of bigger and better speed boat models. It is small, easily made by anyone with a knowledge of the fundamental tool processes, it is good looking, fast, and last but not least in importance, it is inexpensive. A model can be constructed for about $1.25, including the cost of wood, paint and motor. The best distance record made by one of these models was one-eighth of a mile, the average speed being about three or four miles per hour.

It does not follow that your model boat building education is complete after the construction of this model because, as has been stated, it was designed for the beginner. Other models may be made by increasing or decreasing the dimensions proportionately, some having been made 12", 24" and 32" in length.

It is possible in the larger models to use larger spring motors, electric motors and miniature steam engines with flash boilers. It is in the making of the larger models that the real thrill comes in the tinkering with the motor, batteries, running lights, fittings, etc. All this brings out the mechanical genius in a boy and makes him feel that he is working with something more interesting than a block of wood.

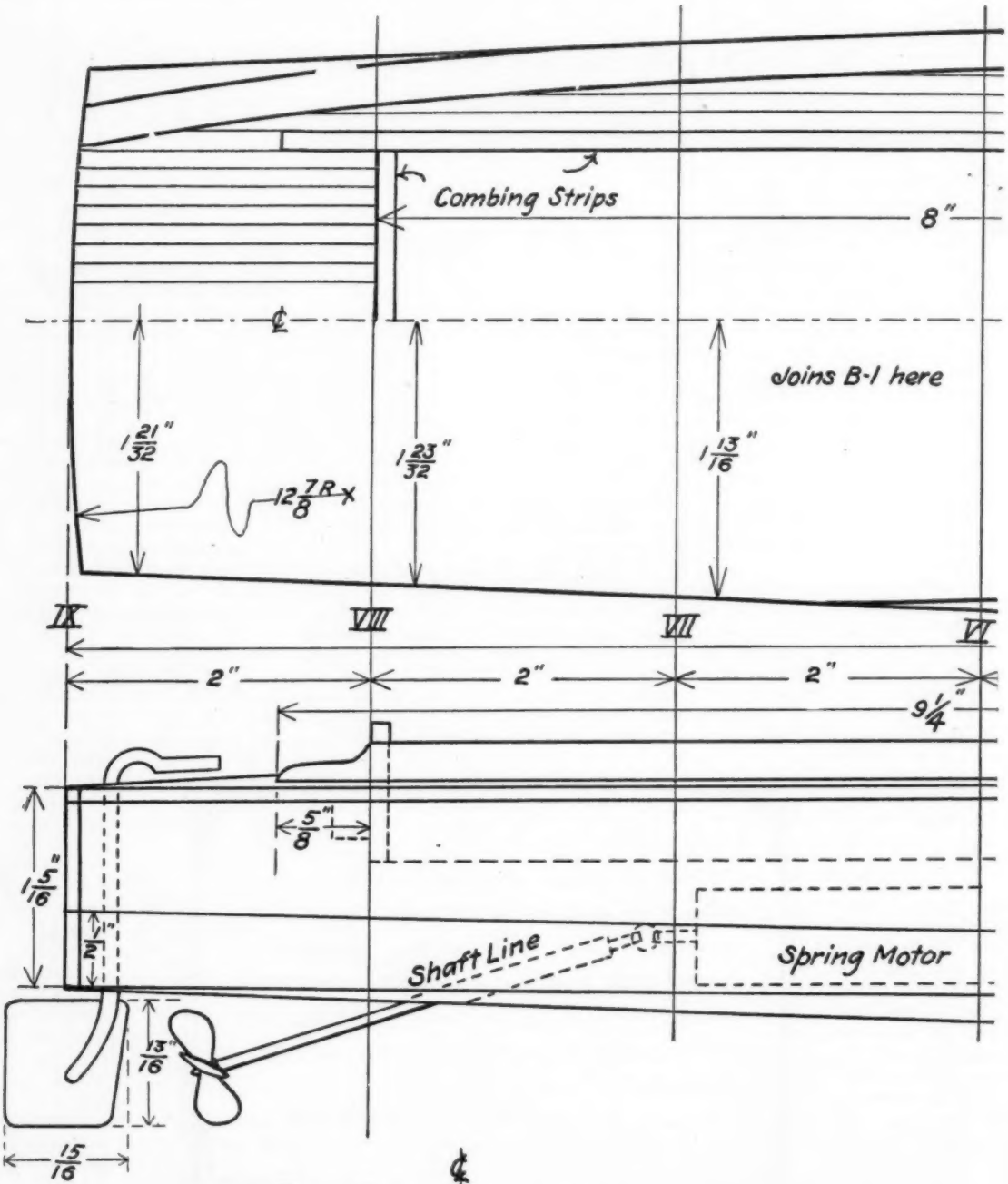
Needless to say these models may be, and have been, developed so that they are exact replicas of their big brothers and much may be learned in their construction.

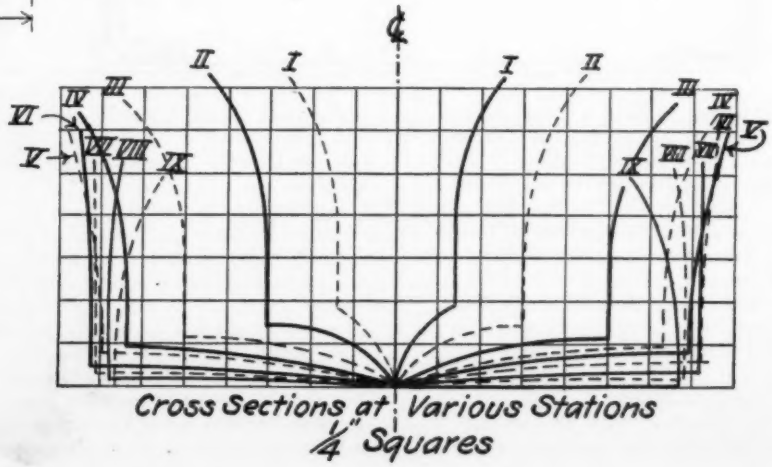
To make the model, proceed as follows:

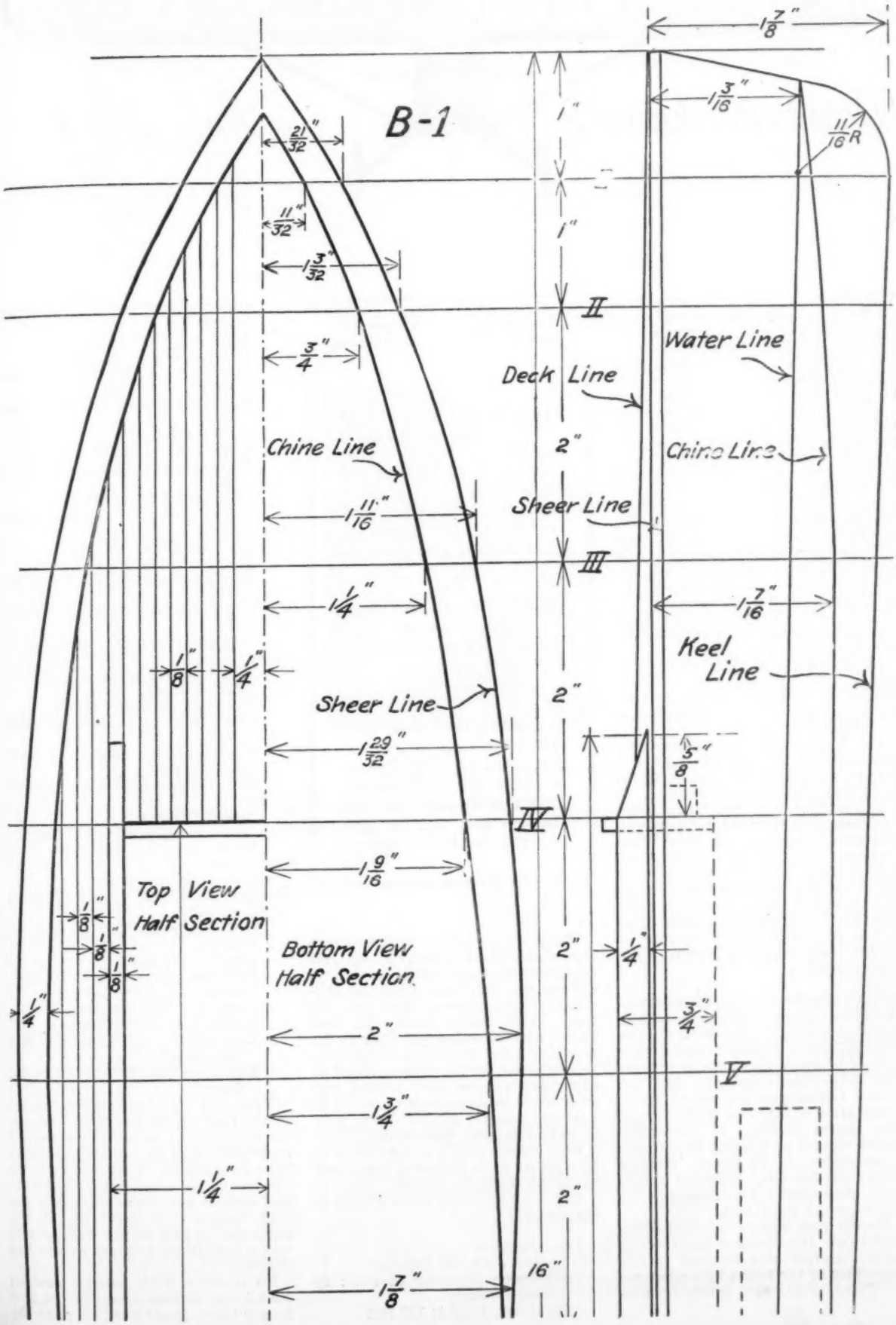
1. Look over and become familiar with the plans.
2. Make full-size half templets or patterns of the sheer-line and the chine-line shapes as shown on the bottom view half section. Use thin wood or heavy cardboard.
3. Make full-size half templets of the various station cross sections. If these are made of cardboard about 3" x 5", half section shapes may be cut out of diagonally opposite corners. These, as well as the templets in Step 2, should be accurately laid out and carefully cut, as the trim shape of the model depends on accuracy all the way through.
4. Square up a block of soft, clear, white pine to 1-7/8" x 4" x 16". White wood, cypress or balsa may be substituted but the first two are heavier and harder to work and the latter requires the use of tools with very keen, razorlike edges.
5. Lay out lines on edges and one end for tapering and taper same with plane or spokeshave.
6. Lay out center lines on top and bottom and with sheer-line and chine-line templets, lay out top and bottom shapes.
7. Lay out station lines on top and bottom.
8. Saw away surplus wood and plane or spokeshave to top and bottom shapes. Sides should be flat from bottom to top. If this operation is performed carefully, the exact angle will appear on the bow and sides.
9. Continue station lines from top down the sides, connecting them to corresponding lines on the bottom.
10. Lay out lines on sides from a point 1-7/16" down on station 3 to the bottom of the stern. (This is the chine-line shown on the side view of the plan.) Continue from 1-7/16" down on station 3 in a slight curve to a point 1-3/16" down on the bow.
11. With a plane or spokeshave shape the bottom, making it a "V" shape from the chine-line to the keel-line.
12. The slight curve upward, from the bottom between stations 7 and 9 to the top, is called the "Tumble Home." This is shaped by laying out station 9 on the stern end and working it down with a spokeshave.
13. Starting at station 1 and working toward the stern end, gouge out grooves in sides and bottom to match up with the station templets. Layout warning line all around boat 1/8" down from the top.
14. Remove surplus wood in between these grooves by making many gouge cuts (*Continued on page 56*)

THE thorough and practical experience of the author, for six years a teacher of manual training and for four summers a model boat building instructor at a large camp for boys, makes certain the success of your model, if the details are carefully followed.

THE EDITOR.


Combing Strips
8"
Joins B-1 here
1 21/32"
1 23/32"
1 13/16"
12 7/8 R X
IX
VIII
VII
VI
2"
2"
2"
9 1/4"
5/8"
1 5/16"
1/2"
Shaft Line
Spring Motor
13/16"
15/16"


Cross Sections at Various Stations
1/4" Squares


B-1
1 7/8"
1 3/16"
11/16 R
1"
1"
21/32"
11/32"
1 3/32"
II
3/4"
Water Line
Deck Line
Chine Line
2"
Chine Line
1 11/16"
Sheer Line
III
1 1/4"
1 7/16"
1/8"
1/4"
Keel Line
Sheer Line
2"
1 29/32"
5/8"
IV
1 9/16"
Top View
Half Section
1/8"
1/8"
1/8"
Bottom View
Half Section
2"
1/4"
1/4"
2"
3/4"
V
1 3/4"
1 1/4"
2"
16"
1 7/8"

# MACFADDEN AVIATION ADVISORY BOARD

WELL, this month it is dirigibles. Apparently, the recent ring-laying ceremony of America's new monster *ZRS-4* has set everybody hot-foot after information, seeking proof that the giant airship will be the largest in the world when completed.

There is no question that America today has started on the road to take the lead in the development of this type of aircraft. The United States Navy in 1923, in spite of the calamity which befell the British *R-38* when it exploded over the River Humber in England with a loss of many lives, completed *ZR-1*, or *Shenandoah*. This dirigible was a rigid of the *L-33* (Zeppelin) type and made some extraordinarily successful flights. In 1925, however, the *Shenandoah* met with disaster. The then giant dirigible was wrecked in a storm while crossing over Ohio.

In 1924 *ZR-3* (*LZ-126*) was completed by the Zeppelin Airship Works at Friedrichshafen in Germany and was flown from that base to Lakehurst, N. J.

The flight started on October 12th and ended on October 15. *ZR-3* was then transferred to the United States Navy and renamed *Los Angeles*. It is noteworthy that Dr. Hugo Eckener, commander of the *Graf Zeppelin*, was also commander of *ZR-3*. This transfer of *ZR-3* to the United States Navy nearly wrecked the hopes of the Zeppelin Airship Works at Friedrichshafen and it was not until 1928 that Friedrichshafen again came to the fore with the launching of *LZ-127*, more popularly known as the *Graf Zeppelin*.

THIS monster was built from funds subscribed by the German people. The fund was opened in 1925. On October 11, 1928, the *Graf Zeppelin* with a crew of forty and twenty passengers left Friedrichshafen for the United States and arrived at Lakehurst after a flight of 111½ hours. The return journey to Friedrichshafen started on October 29 and was accomplished in 71 hours. Shortly after this, the *Graf Zeppelin* undertook successfully its now famous flight around the world.

Hardly had amazement died down concerning this wonder flight when public interest was aroused in the launching of the now world's largest dirigibles, *R-101* and *R-100*, by Britain.

**EACH month the Macfadden Aviation Advisory Board will endeavor to answer all questions concerning model building and aviation in general. Address all questions to**

**The Macfadden Aviation Advisory Board, MODEL AIRPLANE NEWS 1926 Broadway, New York City**

**Enclose with your letter a self-addressed and stamped envelop to facilitate an answer, as space is limited and all letters can not be answered in these pages.**

There was much caustic comment concerning these two dirigibles and engineers did not hesitate to express the opinion that both would be failures. This, however, was not the case. Both made successful test flights and were then put back in the workshops for structural alterations to conform with the design. Further experiments have been carried out with *R-101* in that she is to be cut in half and a center section 75 feet long is to be inserted. This will give her a total length of 784 feet, which will be within twelve inches of the length of *ZRS-4* when completed.

The dimensions of these giants of the air are:

*Los Angeles*—
- Length over all: 656 feet
- Maximum diameter of hull: 90 feet, 6 inches
- Maximum height: 102 feet
- Cubic capacity: 2,470,000 cubic feet
- Load capacity: 80 tons
- Disposable lift: 40 tons
- Maximum speed: 76 miles an hour
- Cruising speed: 67 miles an hour.

*Graf Zeppelin*—
- Length over all: 772 feet
- Maximum diameter of hull: 100 feet.
- Maximum height: 110 feet
- Cubic capacity: 3,000,710 cubic feet
- Load capacity: 107 tons
- Designed pay load: 15 tons
- Maximum speed: 80 miles an hour
- Cruising speed: 68 miles an hour.

*R-101*—
- Maximum length: 724 feet, 3 inches
- Maximum diameter of hull: 131 feet, 8 inches
- Maximum height: 140 feet
- Cubic capacity: 5,000,000 cubic feet
- Contract speed: 70 miles an hour at 5000 feet.
- Cruising speed: 63 miles an hour.

*R-100*—
- Length: 709 feet
- Maximum diameter: 133 feet
- Cubic capacity: 5,150,000 cubic feet
- Gross lift: 156 tons
- Estimated full speed: 82 miles an hour
- Cruising speed: 75 miles an hour.

*ZRS-4*—
- Length: 785 feet
- Maximum diameter: 132.9 feet
- Maximum height: 146. 5 feet
- Gross lift: 403,000 pounds
- Useful lift: 182,000 pounds
- Gas capacity: 6,500,000 cubic feet (estimated)
- Maximum speed: 83.8 miles an hour.

You will see from the measurements that *ZRS-4* and *ZRS-5* (a sister ship also to be built at a cost of $8,000,000) will be the largest dirigibles in existence. They will be twice the size of the *Graf Zeppelin* in cubical content and about thirty-five per cent. larger than *R-101* and *R-100*. Both *ZRS-4* and *ZRS-5* will be two and a half times as large as the *Los Angeles*.

To conform with present designs *ZRS-4* will be only about fifteen feet longer than (*Continued on page* 69)

AT LAST

# What Every Boy Should Know About Aviation

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### Partial List of Contents

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What Is Aviation's Greatest Need Today?
What's Next in Aviation?
The Principles of Flight
Aircraft Design and Construction
The Airplane Motor
Types of Aircraft
How the Dirigible is Built and Controlled
A School for Lighter-Than-Air-Flying
The "Tin" Bubble
Aircraft Instruments
Keeping the Flyer Weather-wise
How Radio Guides the Aviator
Learning to Fly
The First Flying Lesson
Licensing of Pilots
Distinguishing Marks for Aircraft
Aviation Schools and Colleges
Stunt Flying
How to Fold and Pack a Parachute
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# The Avenger from the Skies

(*Continued from page* 33)

sides, Dad, I'm going to need you now—bad." That last got Dad. He turned slowly away, his shoulders bowed.

Leaving a part of his posse with instructions to carry out his order to get the Dawnhart Company out of the valley, Sheriff Dozer started for Crosscut with Dan, handcuffed, on a horse beside him.

Steinfeldt apparently accepted the sheriff's ultimatum, but he made one appeal.

"Give us until tomorrow night to get our stuff packed?" he requested.

The sheriff acceded with a curse. Had he known what was in the movie director's mind, the request would not have been granted. Before the sheriff had reached Crosscut with Dan, McKelvie in his fast Fokker was winging his way toward Hollywood with a message. The sheriff's men, knowing nothing of the movie business or planes, did not grasp the significance of the vanishing speck in the western sky.

ONCE more Dan was seated on the hard bench in the ramshackle Crosscut jail. The ancient jailer, Sarvice, chuckled when he saw him.

"Ain't so smart, be ye young feller?" he taunted. "Well ye won't crack no boards loose this time."

Dan saw that the broken wall of the jail had been repaired and that the whole structure had been reinforced. Only the same iron bars remained at the high window. It looked hopeless. Dan wondered what Tom would think of his absence when he did not appear that evening on the mesa as he had promised?

Dan was feeling pretty desperate. When Simons, silk-hatted and leering, accompanied the jailer to the one cell of the jail and peered through at him late that evening, he would have leaped upon him with his bare hands had not the bars intervened. Simons did not say anything, just looked at Dan, gloating.

Evidently Simons had decided to take no chances on Dan escaping this time. Dan heard him order the jailer to stay in the corridor close to his cell.

It was dark when the jailer brought Dan's supper. He opened the door of the boxlike cell cautiously, shoved the platter in and retreated hurriedly, cackling to himself. The food lay there untouched.

Dan wondered what Tom was thinking by this time. And if the Mexicans had started the drive on the longhorns.

He got up and paced the cell. His eyes came level with the lower part of the window. Outside the little jail, which was at the edge of town, there was no sound.

"If ye hain't goin' ter eat that 'ere grub, might as well take it outa there," came the jailer's cracked voice.

Dan turned around. The jailer unlocked the door and stepped inside. Sure enough, he had a long six-gun stuck awkwardly in his belt. Dan glanced at the window again. His eyes narrowed and he estimated the distance to the door. Then a better idea hit him.

"Huh!" he grunted. "You fellows may be smart fixin' up the walls of the jail, but you ought to have patched up that busted bar on the window."

Dan jerked his thumb toward the barred hole.

"What?" he asked, straightening up and looking at the window. "By crimminee! I tol' 'em they oughta look at that 'ere winder. Dern fools that'd——"

The jailer stepped past Dan, his near-sighted eyes straining to see the iron bar Dan had indicated. Dan hated to hit the man, and in fact he did pull the punch somewhat, but not enough to prevent the jailer from slumping down like an empty sack.

In five seconds Dan had the key and the jailer's gun. In another ten seconds he had torn the jailer's shirt into strips, tying him up and using part of the shirt to stuff into the man's mouth. Then he locked the cell door, slipped along the corridor and stepped into the dark street.

He had gone half a block, keeping under the deep shadow of the trees when he heard footsteps. A man was coming toward him, alone. Dan stepped behind a tree and waited for him to pass. When he was a few paces away, the man stopped and struck a match to light his cigar. Dan's breath almost stopped. The man was Simons.

Dan's astonishment was followed by a wave of anger that almost choked him. Had he followed his first wild impulse, he would have had a real murder charge hanging over him. But he held his hand, with his finger trembling on the trigger of the jailer's gun.

SIMON'S blew out the match and came on. When he was opposite the tree, Dan stepped out, jamming the muzzle of the gun into the mayor's stomach.

"Turn around, keep your mouth shut, an' keep goin' ahead of me," ordered Dan.

Just once Simons started to speak. A sharp prod of Dan's gun in his ribs silenced the attempt in a choking gasp.

"You keep on walking if you want to live," gritted Dan.

And he meant it. Simons read it in his voice.

At first Dan had only the idea of driving the mayor ahead of him until he had got a safe distance from Crosscut. But as their feet took up a steady marching rhythm, heels beating on the hard road, Dan's idea changed.

Dan figured he might have only an hour or two, perhaps not that, and at the best only a few hours until the jailer would be discovered. It was several miles to the Dawnart location.

In the person of this man Simons centered all the trouble that had come to Dad. In some manner, through his control of money or politics, Simons had been able to set up what virtually amounted to a lawless rule through the very officials supposed to enforce the law.

Then, decided Dan, it must be from Simons himself that would come a readjustment of the queer kind of justice Crosscut was handing out. He wondered what Simons would do if his life were at stake, or if Simons could be made to believe that it was?

DAN hoped for time to reach the location and get to his "Eagle Longhorn" plane. He had to chance running foul of some of Sheriff Dozer's men.

Then the tents of the moving picture company loomed ahead in the valley. Dan could see the movie planes drawn up in their usual place at one side. It would be like the rather stupid townsmen to leave them unguarded.

He added one more word of warning to Simons.

"One peep out of you and all the help you can get will be one bullet too late," he said quietly.

And Simons believed him.

He guided the mayor past the first tents and along the row of planes. The "Eagle Longhorn" stood in its regular place at the end. They were passing the middle of the line when a man stepped out. Simons started forward, but stopped abruptly.

"What the—that you, Dan?" Sanderson, one of his flying buddies, stepped close. "Good Lord! What are you——"

"Sit tight, Sandy," said Dan. "Want you to help me hop off." Then Dan had a thought. "No, I guess not," he said slowly. "That would get you in bad if you helped me make a getaway. I'll——"

"Aw, lay offa that dumb talk," growled Sanderson. "There's goin' to be a lot of others in plenty bad before this time tomorrow night, and I don't mean maybe. They've——"

He shut his mouth quickly, looking at Simons.

"But never mind. Them dopey deputies have beat it for the hay back home. They're comin' back tomorrow to see that Steinie pulls up stakes, an' then—Oh, boy!"

"Come on then," said Dan, relieved to learn that the deputies were gone.

Simons, his hands shaking, climbed into the rear cockpit of the "Eagle Longhorn" at the urge of Dan's persuasive gun and Sanderson's ungentle hands. Sanderson, at Dan's suggesten, fastened the straps.

"Now," said Dan. "If you have an

idea when we start that you can make a break because I happen to have my back to you, just keep in mind that if anything happens to me you're goin' to hit so hard you won't even bounce."

Having decided that he was not to be killed outright, Simons found his tongue for a moment.

"This outrage—this highhanded lawlessness is goin' to put you fellows in the pen for the rest of your lives. I'll see to it that you're sent up if it's——"

"Say, mister," cut in the drawling voice of Sanderson. "You'd better be makin' your last peace on earth 'stead o' threats. You don't know this lad, Dan, or you'd be figurin' what star dust's worth by the bushel. 'Cause, mister, you're sure goin' to be pickin' a heap of it or I'm dumber than I look."

Sanderson brought more gas and oil while Dan waited with his ears cocked for any sounds from the road leading to Crosscut. Simons had slouched down in the second cockpit, a picture of misery. He had had no experience with airplanes and his initial flight did not promise to be much of a joyride. He had a lot to think about and Dan speculated on whether or not he would crack and loosen up with some of the devilment he had a hand in.

Dan did not want him to talk. Not yet.

AT the first hint of light in the east, Dan gave Sanderson the word and he spun the propeller. Dan idled the motor only long enough to warm up before he raised his hand to Sanderson and taxied across the field.

Dan pulled the stick to climb in a tight spiral. He was going to take a chance on finding the Minion Mesa landing before day broke across the valley. At a little more than 5,000 feet, which would bring him level with the mesa, Dan straightened out.

The mesa stood out like a great black lump in the faint morning light. The first rays of the sun were reaching its high top long before they pierced the gloom of the lower valley. Dan found it was no trick at all to set the plane down easily.

Tom, aroused by the thunder of the motor, came running across the field. He climbed onto the side of the plane, his voice almost sobbing with relief at the sight of Dan.

"Oh, I thought something had happened—that they'd got you. I was nearly crazy enough to jump over the cliff. The Mexicans are back—I could hear them driving cattle into the canyon. I——"

Then Tom saw the face of Simons over the edge of the second cockpit. His eyes took on a wild look of appeal, questioning Dan.

Dan read his thoughts. He grinned reassuringly.

"Don't worry, son," he said quickly. "His honor, the judge, isn't hunting you this time. The shoe's kind of on the other foot. Expect you'll have a job playin' jailer to your friend be-


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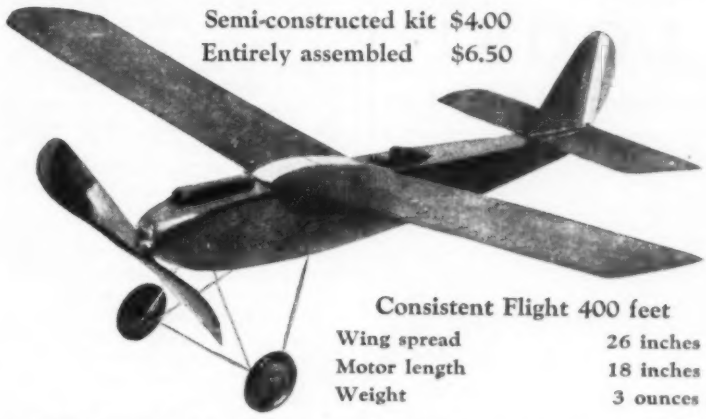

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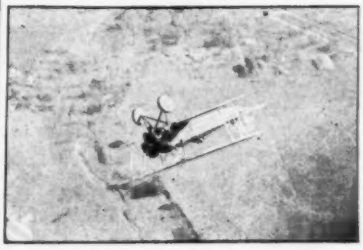
# oooOOH LOOK!

**He's Starting an Inverted Loop**



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*What scale models would you like to build? Tell us, for we want to prepare drawings for models you'd like to construct. Feel you're writing to friends who would help you when writing to us.*

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fore we get this job finished."

Tom's bewilderment caused Dan to laugh in spite of the seriousness of the situation.

"You say the Mexicans drove some cattle in last night?" he asked, to help Tom steady his nerves.

"Yes, a big bunch. They were yellin' nearly all night. I was scared an' I sneaked part way down the trail and, Dan, there was some white man with 'em. I could hear him yellin' at the cattle in English."

That would be the double-crosser, Monty, thought Dan.

"Then today's the day," said Dan cryptically. "Soon as we've got our friend fixed up in the cave under the shelf, we've got a lot to do."

Simons was either too dazed at the situation in which he found himself to talk, or had seen the hopelessness of it. Without a word he obeyed Dan's order to get into the shelter under the rock shelf. Dan handed Tom a rifle.

"Your job most of today is to keep your eye on the mayor," he told him. "An' remember this: If it was him had that gun you'd be dead meat—get me?"

Tom's hands were trembling, but his lips were a straight line when he replied. "I got you."

Dan's first job was to load the bomb racks of the plane. Then he refilled the Vickers gun with a "fire" tracer belt. That was poor ammunition, but it was the best he had. However, he had great faith in the efficacy of those smoke bombs. They were not nice playthings, even though they were intended for only mimic warfare.

Cold fighting rage swept through Dan. Never before had a fury like that possessed the youthful flyer. Cautiously he had inched his way down the trail from Minion Mesa. He had reached the bend that gave him a view of the pocket canyon.

Covering all of the meadow, milling and surging, their long horns tossing, more than a thousand of his father's cattle were being close herded by cursing, shouting Mexicans. The big raid had come off. Dad's pride, the work of his lifetime, was in the hands of the Greaser rustlers.

DAN could hardly restrain himself from blazing away with his rifle at the cattle thieves. Had Monty, Dad's double-crossing white foreman, been there in sight, Dan was sure he could not have kept his itching finger off the trigger. But this game would have to be played in another fashion.

He turned to go back up the trail. His foot dislodged a stone. It bounded off the ledge and went crashing down the steeply sloping wall. Dan hoped that the noise made by the cattle would prevent the rustlers from noticing the falling rock. But the crack of rifles from below told him that he had been seen. The bullets flew wild and almost instantly Dan was concealed from the Mexicans as he ran up the trail. But the damage had been done.

Shooting at random, although they had no visible target, which is a Mexican idea of fighting, the rustlers were rushing up the trail behind him. Dan did not stop until he had reached the mesa. A short distance below the edge of the table-topped mountain, the trail divided into several narrow fissures that ran off to both sides. One of these reached the top near the eagle's nest.

WHERE the trail broke was a sharp shoulder of rock. The path was only about three feet wide at this point. From the top of the mesa itself one man could hold off a hundred coming up the trail. Dan shouted to Tom.

"Stay where you are—the rustlers are coming. Keep your eye on Simons—I'll take care of this."

Dan flattened himself on the mesa edge, rifle trained on the bend in the trail. He heard the voices and the climbing feet of his pursuers. The muzzle of a gun appeared first around the rock. It streaked fire and the bullet lost itself in the air over the mesa.

Dan could not see the man who held the gun, but he drew a fine bead on the barrel of the rifle and pulled the trigger. The shot drew a yell of pain, the Mexican's gun banged to the rocks and went clattering down the sloop. Then two rustlers sprang around the corner, their guns cracking.

Chipped rock and dust flew into Dan's eyes, but the muzzle of his rifle wavered only enough to move from one to the other of his attackers. The result taught the Mexicans behind the shoulder their lesson. No other man exposed himself to that cool, deadly aim. A hat showed, and Dan could tell it was on the point of a gun. He ignored it. He was not wasting ammunition.

But the hat remained stuck out, moving up and down. Dan got nervous. Something was happening. That old ruse of the hat was being used to hold his attention. Anxiously he scanned the fissures that branched off from the trail. He could see no movement.

The silence lasted no more than two or three minutes, but it seemed like an hour to Dan. He glanced over his shoulder and made sure that Tom was sitting tight. The white-faced boy was holding his rifle across his knee, hands tensed on the barrel and trigger guard. Dan grinned at him reassuringly.

This could not go on. Perhaps the Mexicans on the trail were only covering up for their companions in the canyon. Probably they were already moving the cattle. Dan decided he would have to force an issue. He was rising to his feet, eyes still fixed on the moving hat, when he heard a scuffling sound on the edge of the mesa near the eagle's nest to his right.

A Mexican shouted. Two more men leaped suddenly into the trail before him, guns blazing. Dan got one, but the other was unhit. He

started climbing. Dan pulled the trigger of the rifle. The hammer snapped. The last shot. He threw the gun behind him and whipped the automatic from under his arm where he had strapped it.

Eyes on the Mexican climbing toward him, Dan had forgotten that scuffling noise over to the right. Tom cried out. Dan looked around, saw Tom raising his rifle, and heard him shoot. But the bullet missed the Mexican who had crawled along a fissure and who now sprang to his feet a short distance from the eagle's nest.

Tom forgot his prisoner or perhaps he thought that Simons, being unarmed could do nothing. He started to run around the clump of rocks toward the Mexican who had gained the mesa. The Mexican coming up the last few yards of trail toward Tom had dropped into one of the fissures, and he, too, was watching the other man who had reached the top.

Dan saw the Mexican raise his rifle waiting to get Tom in the sights. The man was too far away to make a shot with the pistol effective. Then a scream that sounded almost human rang out. A shadow followed the scream out of the sky. With great wings outspread, the cry of attack rasping from his throat, Old Baldy, the eagle, flashed down upon the Mexican at the lip of the precipice.

The eagle, soaring home, had seen the invader beside his nest. With the courage of his kind when its young are threatened, he came with beak and talons to do battle. Taken by surprise, the Mexican flung up his arms to protect his face. The rushing weight of the eagle struck him full on the breast. Knocked backwards, off his balance, he took one step. Only the emptiness of space was under the foot when he put it down. With a wild cry of terror he toppled over the wall.

Dan was brought sharply back to the Mexican below him when the man's rifle cracked and the bullet burned along his cheek. He turned, dropped to his knees and moved along the top of the wall, trying to get the Mexican in view. The Mexican, probably thinking he had hit Dan, slowly raised his head, looking toward the spot that Dan had just vacated.

Dan's automatic spat fire only once.

He reached the corner of rock. The Mexicans were gone.

Now to get to the plane. Dan darted back toward the top. Then he heard Tom cry out.

Pistol in hand, Dan came up.

"Put 'em up dam' quick!"

Simons, with a rifle leveled at his face, was waiting for Dan. There was murder in his eyes.

Back of Simons Dan saw the huddled figure of Tom lying on the rocks. Evidently, while he had been watching the Mexican and the attack of the eagle, Simons had surprised him. Had knocked him out cold.


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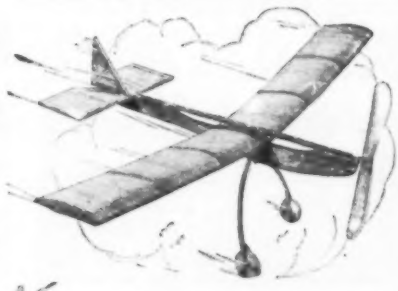

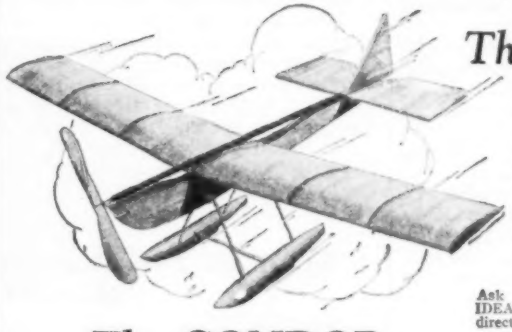

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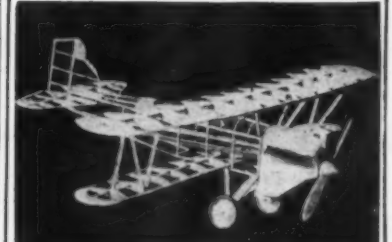
The Curtiss Army Falcon



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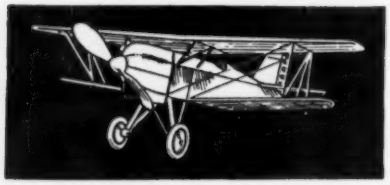
# TWO FOOT
## Curtiss Hawk Biplane



The Two Foot Curtiss Hawk is a flying model of the fast, maneuverable Army pursuit plane. Our plan is drawn to scale, and flights of 300 feet have been obtained with this model.

The construction is balsa wood. Only the lightest parts are used.

The construction set contains all necessary parts, including cut out body sides, celluloid wheels, two colors of dope for coloring the model, bent wire parts, etc. All necessary parts on the plan are drawn full size, and the plan and instructions are very complete.

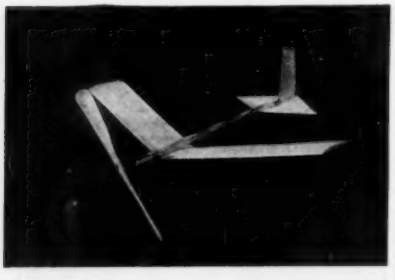
**Complete Construction Set.....$2.50**

### Two Foot Junkers
### Low Wing Monoplane

This model has flown over 500 feet. It is a simple model to build, compared with others, as the body sides, ribs, wing tips, wire parts are formed, also celluloid wheels.

This is a better flying model than the Curtiss Hawk for distance, but cannot compare in looks.

**Complete Construction Set.....$2.50**



The Baby Tractor is the simplest model to make, and as it contains only just enough parts for flying, will outfly many a larger and more costly model. This model has been flown out of sight many times, under the right conditions, and when fairly well made will average about thirty to sixty seconds duration.

**Complete Construction Set ..... $.50**

***Catalog $.05***

**Hawthorne Model Aero. Co.**

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Dan's heart sank. Simon's lips were pulled into a crooked evil grin. He had Dan where he wanted him, and he could not resist his opportunity to gloat over the boy flyer.

"In one minute you're goin' to be all through," he snarled. "I'm goin' to rough ride your smart friends outa Boomer Valley. Your father's goin' to pay up for all the stuff you've pulled an' don't you forget it."

AT mention of Dad, Dan's hand twitched on his automatic.

"Drop it or you won't live the rest of the minute," snapped Simons. "Now turn around an' walk. You're goin' to have your choice. Bunch o' lead in your guts or smash up on the rocks down there. Get movin'."

Not because he would have chosen the bullet to a plunge down the wall of the mesa, but because he wanted every second of time to think, Dan turned slowly and walked toward the precipice where the Mexican had gone over.

With uplifted hands he faced out into the wide space below. In the distance he could see the white tents of the Dawnart Company. If he could only have got word to Sanderson.

He was close to the edge now. Simons' rifle prodded him sharply in the back. Then Dan leaped suddenly to one side.

*Does Dan get out of his serious predicament? Is the treacherous Simons outwitted? The last sentence is but the beginning of some more thrilling action—but discover it for yourself in the next installment, which is the final one. In the May* MODEL AIRPLANE NEWS.

## How to Build a 16" Model Speed Boat

(*Continued from page 47*)

across the grain, but be careful.

15. Wrap a piece of No. 2 sandpaper around a cylinder of newspaper and smooth entire block. Care should be taken to see that all corners are left sharp and also that station shapes are not interfered with.
16. Lay out lines on top for gouging out inside. These lines should be 1/4" in from the sheer-line, except on the bow and stern where at least 3/4" of wood should be left for strength.
17. Gouge out and then smooth inside, first with chisel and No. 2 sandpaper and then with No. 1 sandpaper.
18. Varnish or white lead the inside.
19. Lay out and cut deck beam joints. There are two deck beams, one at station 4 and one at station 8. Both are made with a 1/8" crown or rise to give the deck the proper curve.
20. Glue or cement deck beams in place.
21. Make deck of a piece of 1/8" basswood which has been planed and sandpapered to 3/32" thick. Warp this by sponging one side lightly and placing that side to heat. When dry, varnish underside and fasten to hull with No. 20 x 1/2" escutcheon pins at 3/4" intervals.
22. Lay out lines on deck for cockpit opening and cut out with sharp knife.
23. Make pieces to be glued or cemented under deck between deck beams to which combing strips will be fastened.
24. Make and install side and end combing strips. Use 1/8" basswood. End strips have 1/8" crown and all are fastened with escutcheon pins.
25. Line deck with scratch awl to resemble planking, as indicated on top view.
26. Smooth entire boat with No. 1/2 sandpaper.
27. Give entire boat two coats of thin shellac.
28. Rub down with No. 000 steel wool and give sides three or four coats of thin "duco", rubbing each coat with steel wool. Allow each coat at least one hour to dry.
29. Locate water-line and fasten a piece of adhesive tape all round with lower edge on the water line.
30. Give bottom part three or four thin coats of another shade of "duco", rubbing each coat as in step 28.
31. When dry, carefully remove the adhesive tape and give entire boat two coats of thin spar varnish, allowing at least thirty-six hours between coats.
32. Rub down with No. 000 steel wool and wax.
33. Make stand of two pieces of whitewood 1/4" x 1-1/4" x 2-1/2". One edge of one piece should be shaped to fit under station 4, and one edge of the other should be shaped to fit under station 8. Fasten together with 1/4" dowel sticks.
34. Make rudder of No. 22 sheet brass. Rudder shaft is 1/8" brass rod split on one end with a fine tooth hack saw.
35. Drill holes for rudder and propeller shafts. Both should fit tightly.
36. Install rudder, propeller shaft and motor.
37. Wind up and try out in bath tub. Do not run motor out of water.
38. Tinker with, adjust and oil motor with thin oil until maximum speed and distance are obtained.
39. Always dry boat off after running, paying special attention to the motor.
40. Paint a good, snappy name on each side between stations 3 and 4.

(*See Plans on pages 48 and 49*)

# A Trim, Fast-Climbing Navy Fighter

(*Continued from page 35*)

in and the tail ends secured together. A curved cowling, shaped from a block of soft balsa, is built over the two forward frames.

Note the use of three grades of balsa, hard, medium and soft, in this model. There is quite a distinction, the hard being nearly twice as heavy as the soft, but correspondingly stronger. Longerons are of 1/8" x 3/16" medium balsa, and struts or cross frames of the same size and grade.

Bob McCorkle displaying the completed model

Next build the wing frame. It is important, of course, that this as well as the tail assembly be made as light as is compatible with strength, for weight should be concentrated at a central point below the wing and about one-third the distance back from the entering edge. Spar and entering edge are comparatively light for this weight model, but as designed are uncommonly strong.

In scores of flights before these photos were taken neither wing nor other structure suffered the slightest damage. Note that the spar, although of only 1/8" x 3/8" section is of soft balsa, as are the 1/16" ribs and false ribs. Number 12 piano wire is used for the curved tips.

The entire wing frame is made in one piece on a flat board on which the true outline and location of ribs has been marked. To taper the trailing edge from the 1/8" x 3/8" soft balsa, clamp a small plane (it must be razor sharp and set to light cuts) upside down in a vise and draw the balsa over it, gradually working it down to the required taper toward the rear edge. Finish with medium sandpaper.

After the entire wing frame has been assembled and ambroid has set, cut the spar—and the spar only—at the center. Next lay the frame down on two flat boards joined together to give a one-degree dihedral. Ambroid the cut in the spar, and place weights on the frame to hold it to the dihedral until ambroid sets. Entering and trailing edges are simply bent for the angle.

Wing supports are made of number 18 piano wire and raise the wing one-half an inch above the top of the fuselage. The wing is secured to the latter by means of the usual rubber bands which permit adjustment forward or back.

McCorkle emphasizes the importance of a light tail which permits wing to set well forward, thus giving the ship a snappier appearance. By using bamboo for entering edge and number 12 piano wire for trailing edge and soft balsa ribs, a very light job is possible. The stabilizer is tied to the fuselage in such a manner as to permit vertical adjustment at the rear by means of a wire "W" engaging in a notched bamboo stick. A typical rib outline is given in the drawing.

The rudder frame is very simple, with an extension of the trailing-edge wire inserted in the end of the fuselage as an axis and the leading-edge wire extension moving to right or left in a slot in the top of the fuselage, as shown. A light wire spring holds the front of the rudder to the right—that is, in a normal position until the tension or torque of the wound rubbers forces it to the left by means of rear hook engaging a wire secured to the lowest rib. This is illustrated in detail in the drawing.

Bend the landing gear struts as shown from number 24 piano wire, bind them with thread and ambroid to the first and second cross-members or struts on the bottom of the fuselage. Where the two wire struts join near the axles solder a small brass washer, and ambroid celluloid fairing strips to each leg. An effective and simple shock absorber is made with 3/16" flat rubber band and V-shaped strip of celluloid. Do not clip rubber and celluloid together until ambroid has set.

THE wheels weigh 3/4 oz. each and bring the center of gravity well below the center of the wing. These are made up of ordinary wooden curtain rings for tires, button molds for disks and a 1/8" x 1/2" brass tube and rubber tube bushing over it for hubs. On the inside of the disks iron washers are ambroided to give the effect of brake drums and brings the wheels up to the required weight.

In making the propeller, mark outlines of the blank on a hard balsa block 10" long, 1-1/2" wide and 5/8" thick. The blades are uniformly tapered from the hub to about 1/16" at the tips. The hub is elliptical in section, 1/2" x 5/8", and a hard balsa spinner is turned on a lathe to the shape shown and ambroided to the hub after the shaft has been installed. This spinner is a factor in protecting propeller from damage in a nose dive, as well as adding greatly to appearance.

Number 24 piano wire is used for the shaft. The forward end passes through the propeller hub and is bent over and soldered to a small brass plate which in turn is ambroided over the hub. This prevents the shaft pulling through when wound to the limit.


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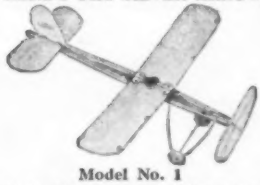

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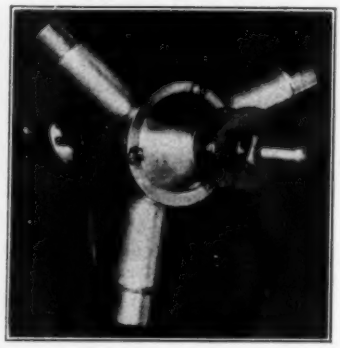

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It is characteristic of McCorkle to place a small drop of solder on the brass plate, opposite the hook of the propeller shaft, to give the propeller perfect balance.

A brass or copper washer is ambroided to the back side of the hub. Standard 1/8″ (outside diameter) brass tubing serves as a bearing in the nose block. A flange is formed by soldering a small brass washer to the forward end of the tube.

Putting fabric on the frame work is a fine art and the appearance of a model depends largely on your skill in this work. McCorkle uses a very high grade Japanese paper known as "Mino Silk Tissue." LePage's glue is applied very sparingly with a small brush.

First glue the paper to the underside of the two central ribs and apply glue to the entering and trailing edges. Then glue the paper to a point on the wing tip, just enough to hold it in place. Now run tips of the fingers over entering and trailing edges in such a way as to bring the paper tighter as you go along. It is not necessary to apply glue to any of the intermediate ribs.

Top side of the wing is done in similar fashion, and this general procedure applies also to stabilizer and rudder.

For the fuselage a separate piece of paper must be used on each side, leaving open panels at the rear for access to the rear hook, and under the front end of the fuselage. When glue is thoroughly dry give the paper one coat of dope, cut half with high grade lacquer thinner. After it is dry, follow with a second coat and when that is dry, a third coat. These may be applied with a soft brush.

The finest paint job is achieved by spraying, using brushing lacquer cut in half with lacquer thinner. A small gun operated by lung power can be made from a small glass jar with a screw cap and some brass tubing, on the same principle as a perfume atomizer or throat spray.

The original model is finished in aluminum on fuselage, landing struts, rudder and propeller, with orange wing and stabilizer. The fuselage is decorated with a red band, shown in the photograph, and red and blue vertical bands on the rudder. Tires are black, disks aluminum, and a black semi-circle is painted just behind the tiny celluloid windshield to indicate a cockpit. For the emblems and lettering, neat stencils are cut in paper with a razor blade, and red, black or blue lacquer sprayed through them.

Your little fighter is now ready for its final test. Put on twelve strands of 3/16″ flat rubber band, draw them out to about three times normal length and wind with a mechanical winder. At first give only about fifty turns with 4-to-1 winder, and up to eighty turns after the rubbers have worked in. The rubbers will give better results and last longer if treated with a solution of glycerin and castile soap.

Experiment will determine the proper adjustment of wing, rudder and stabilizer. The finest adjustment of any of them will result in greatly varied performance. So sensitive is McCorkle's little fighter that even the dampness of night air on the stabilizer perceptibly alters its flight.

# Models as a Scientific Aid to Aviation

(*Continued from page* 34)

contents, that the sender, Penaud, a Frenchman who lived his life in a wheelchair, both hands and legs being completely paralyzed, had laid down the theory of flight on paper mathematically. In addition, it was learned that in 1872 in the auditorium of the French Academy of Science Penaud introduced the first flying model to the learned men of France. The first flying model! The immortals of the French Academy of Science laughed and left Penaud in his wheel-chair with his only friend, who conducted the demonstration by following the instructions of the helpless inventor. This led to a tragedy. Penaud on his return home wrote a last letter and ended his life. In his letter he wrote that, while he could understand the members of the Academy doubting his figures and theory, but to laugh at the actual flight of his model was too much for him to bear. Before he died, he mailed his papers dealing with his theory to the then president of the French Aero Club, where it remained unopened until about thirty years later.

In the same group, we find the "American Leonardo da Vinci," Samuel Pierpont Langley, professor at the Smithsonian Institute, who conducted whole series of scientific flying model tests and who was one of the pioneers of aviation. This group includes, among many others, the Italian Professor Forlanini and the French mathematician, Tatin, both of whom greatly aided the possibilities of mechanical flight based on their experiments with models.

In the third group are those model experimenters who conducted their tests following the first actual flight of the Wright brothers up to the year of 1910.

The first official flying model competition was staged by the French Aero Club in Paris in 1905. The next race was sponsored by the same club in 1907, in which year the English Aero Club also held its first official race. Subsequently, these events were held regularly every year.

How closely these flying models resembled the actual flying machines can be judged by the names of the winners of these model competitions. Among the leaders we find Paulhan,

one of the greatest flyers prior to the World War, who, with the Frenchman, Tatin, made an actuality of Penaud's dream by building a plane according to that unfortunate man's ideas. Paulhan was also the first to build a flying machine with cantilever wings, which appendages were collapsible. For four years he conducted model tests. Among the winners we also find Peyret, incidentally, the winner of the first model flying contest ever held, who later became assistant to Bleriot. Bleriot and Kapferer built airplanes along the lines of Peyret's prize-winning model but without the desired good results. Peyret, however, did not take defeat and twenty years later, a successful manufacturer, he rebuilt his first plane, only to find it a better glider than a mechanically propelled flying machine. For years his glider held world records.

THE winner of the first English model contest, a twenty-seven metre flight, was won by a then unknown Englishman, A. V. Roe, today one of the leading manufacturers of aircraft in the world (Avro Avian, etc.).

Indicating that in those days, model flying was not children's pastime, one of the most learned officers of the French Artillery, Captain Ferber, won special recognition with his models in the flying model contest of 1908. He was one of the greatest experimenters with models in his day.

The famous Voisin biplane is also a development of the small flying model.

During the French flying model contest of 1909, mechants flew small commercial flying toys after the contest and from that day on, model experiments and model flying took a downward trend and was only used by youngsters as a fascinating toy.

After this model race, serious contestants could only be found in the contest held by the Hungarian Aero Club in 1912 and in the national model race in Italy, where noted Italian military and civilian authorities participated.

What has model flying contributed to aviation today? In the first days of mechanical flight, it was determined by a small flying model that the tail of an airplane taking off would have to be raised horizontally off the earth before leaving it. Prior to that, it had been the opinion that the tail had to remain on the ground until the machine actually took off. Voison and Delagrange determined with the aid of models the correct flying position of an airplane. Before that time, the tail of the plane had always been kept hanging lower than the rest. To raise the tail of a plane in a horizontal position in flight was considered out of the question at first. This accounted for the limited distance of an airplane flight, as the plane was unable to gain enough flying speed with the tail down. Henry Farman, the first man to fly a complete closed circle, also flew in this awkward stalled position, keeping the wings of his plane absolutely level while making his turns; ailerons being unknown then. Latham squatted on his heels for hours watching a model fly in a circle with the wings in a bank of forty-five degrees. This model showed that it was necessary to make a bank while going around a curve and led to the installation of ailerons. Captain Ferber in 1908 proved what was then considered impossible; that if a motor stopped while in flight, it would not necessarily mean certain death by a crash and proved, with the aid of a model, that it will glide to earth in steady flight.

A model constructed by the Frenchmen, Lexilleux and Fordu, equipped with automatic elevator and rudder controls made the first, hitherto unheard-of, "stunt flight" in 1908.

Peugeot used models to ascertain the possibility of making a loop before he made the first actual loop on record.

The period following this third group in model flying, in spite of the fact that it is now merely an interesting pastime, has shown a few very striking developments. For instance, the so-far most successful helicopter, built by Petroczy-Karman, is the result of long model tests. Then there is the most outstanding event in recent months, the flight of Fritz Opel in the Opel-Saunders rocket plane. Before Opel entered the plane, one year's experiments were conducted by the Rhön-Rossitten Company with models.

Flying models, up to the present time, have always preceded the actual flying machine. Before Glenn H. Curtiss left the waters of the Hudson River in a plane equipped with floats, a model of the same construction had already done the same. This also applies to the de la Cierva autogyro, the Junkers machines, the cabin planes of today, the parasol type planes, the Prest baby-plane, the Bellanca Tandem plane, the Fernick Tandem plane, etc., where models have preceded the actual machines by years.

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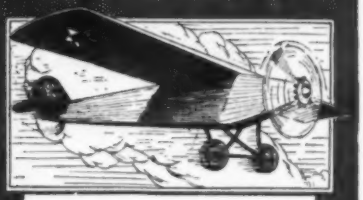

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| 1/8" x 1/2" x 3' | " | .045 | " .054 |
| 1/8" x 1/4" x 3' | " | .054 | " .06 |
| 1/4" x 1/4" x 3' | | | " .24 |
| 1/2" x 1" x 3' | | | " .48 |
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# How to Build Lindbergh's "Dog Star"

(*Continued on page* 21)

formers, as shown in drawings. The five 1/32" x 1-3/4" x 1-3/4" balsa strips are now cut to the correct tapered shape as shown in drawing. These are used to form the N.A.C.A. cowling. The top untapered piece is fastened first and held in place with ambroid and small bank pins.

Follow this layout around the cowling frame by setting in place piece after piece and holding in place with bank pins while the ambroid is drying.

### Cradle

The cradle mounts are made from two pieces of balsa 3/8" x 3/4" x 5-1/4", and cut and carved to shape as shown in drawing 4. Care should be taken to see that the inner curved surface corresponds with the shape of the fuselage. Lay the cradles to one side while construction of the main wing panels is begun.

### Wing

First cut out all the necessary ribs from the 1/16" balsa sheet. There are two ribs to be cut of each size shown in drawing 7. When this has been done, the builder should have ten finished wing ribs. (Note: the holes are drilled before cutting out the inside of ribs, so that they will not split while in work).

Now take the 1/8" dowels or round wood that is to be the main spars. Insert them through the holes for that purpose located in the ribs. The ribs should all be spaced and then ambroided in place, as shown in the wing constructional drawing.

When this has been done, there will be one left and one right wing panel ready for the leading and trailing edges to be installed. The leading edge, which is 3/16" x 1/8" x 12", is cut to the correct length of 9" and tapered from 3/16" to 1/16" as shown in drawing 6. The leading edges are then ambroided in place as shown in drawings 3 and 4. Note that the ribs have slots for this purpose (see rib R-1 in drawing).

The trailing edges are made from the 1/8" x 1/8" x 12" and are cut down to the correct lengths as shown in drawings 3 and 4. These pieces are then ambroided to the rear of the ribs as shown in drawing. The inner ends, where they meet, should be beveled as shown, and ambroided together. This, of course, is not done until the two main spars are slipped in the 1/8" aluminum sleeves. The wing is now all in one piece, and is what is termed "built up cantilever construction." Two pieces of the 1/16" split bamboo are now used to form the wing tips, as shown by the heavy lines in wing drawings 3 and 4.

### Tail Surface and Rudder

In building up the tail surfaces, first cut the necessary formers F-12 and F-13 from 1/16" sheet balsa as shown in drawing 2. These are ambroided to former F-9 in an upright position as shown in drawing 2. A piece of 1/16" bamboo is now shaped to correspond with the drawing of the rudder and fastened in place with ambroid. (Bamboo may easily be bent to any shape if it is first heated over an electric iron, candle flame or bunsen burner.)

The cradles can now be set in place and ambroided as shown in drawing 3, while the rudder is drying. The 1/8" x 8" round wood is now cut to the correct size of the elevator spar, which is 7-5/8" long, the ends being beveled as shown in drawing. Now locate the center point and ambroid to former F-9 just above the two fuselage side bamboo stringers.

It is important that the elevator spar be straight across and level while drying. The elevator formers F-14 and F-15 are now cut from 1/16" sheet balsa as shown in drawing 5. Make two of each and then ambroid securely in position, as shown in drawing 5. The edges are made from 1/16" split bamboo bent to shape in the same manner as was done with the rudder edges.

### Landing Gear

To start construction of the landing gear, first take the 1/8" x 1/4" x 12" and make the two O struts as shown in drawing 7. Then sandpaper and streamline. The V struts, of which there are two, are made from 3/16" x 3/8" x 12" balsa and are also sandpapered and streamlined as shown in the drawing. The T blocks are made from the 1/2" x 1" x 1" balsa, two such blocks being made. When finished these T blocks are ambroided to the O and T struts, as shown in drawings 7 and 8.

Now make the wheel streamline blocks from 1" x 2" x 3-1/2" balsa and carve as shown in drawings 7 and 8. After these streamlines have been carved to a rough resemblance to the drawing, it is advisable to use sandpaper to secure the final shape and finish. The two covers for these wheel streamlines are made from the 1/8" x 1-3/4" x 4-1/2" balsa on hand, making sure that the grain of the wood runs the same as in the streamline. (The lines shown in the drawing show the direction of the grain.) The wheels are put on by inserting a plain pin through the wheel bearings and then through the streamline. Clip off any excess length of pin and ambroid pin end so that it holds in place. The covers can then be ambroided tightly to the streamline and, if necessary, several small pins may be used to hold them in place while ambroid is drying. The T is ambroided in place as shown in the sketch.

### Motor Power

The motor stick is a piece of spruce 1/8" x 1/4" x 12", which is rounded at the front and tapers at the rear as shown in drawing 6. The bearing is put on with thread and some ambroid and the rear hook made from the number 14 wire, as described in the making of the metal fixtures. Number 14 music wire "can" may be used if desired. This always helps to hold rubber in place and also strengthens the motor stick.

The propeller is now carved from the balsa propeller block 9/16" x 1-3/16" x 8", as shown in propeller drawing 7. The propeller hook, which is described in the metal fittings paragraph, is inserted through the propeller hub as shown in drawing and a drop of ambroid used to hold it in place, after the end has been bent over and redrawn in the hub.

Ten strands of 1/8" flat rubber is used for the motive power to turn up the propeller and an S hook of number 14 music wire made at the rear end if the builder desires to use a hand winder.

### Landing Gear

The completed landing gear can now be mounted, points A of the struts R being attached to points B and B1 on number 2 ribs with the wheels toward the wing tips. Struts S meet rib number 2 1-3/32" back of struts R. The O struts are then secured to number 1 ribs as braces.

### Metal Fittings

All metal fittings, such as the motor stick clips, the rear hook, the S hook and the propeller shaft, are made and bent to shape from number 14 music wire. These fittings are easily made with the aid of a pair of round-nosed cutting pliers and should be shaped, as nearly as possible, to correspond with drawings 5 and 6.

### Covering

To cover the wing, tail surfaces, rudder and fuselage use the Japanese silk Hackone tissue paper. Fasten this to the wooden parts with banana oil or thin paste. The space near the cradles on the top of the wing is not covered, so that after the fuselage has been covered and doped with banana oil, the correct setting for the wing can be found.

Take a large rubber band and hold wing to the fuselage, gliding your plane until the correct setting is determined. The plane should make a perfect glide from the hand to about three or four feet in front of the person testing it, if the setting is right. After the correct position is found and has proven satisfactory, ambroid the cradles to the fuselage


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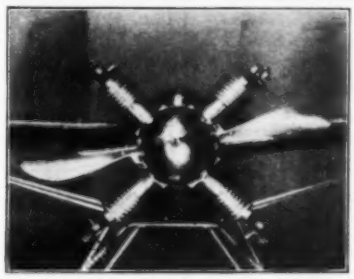

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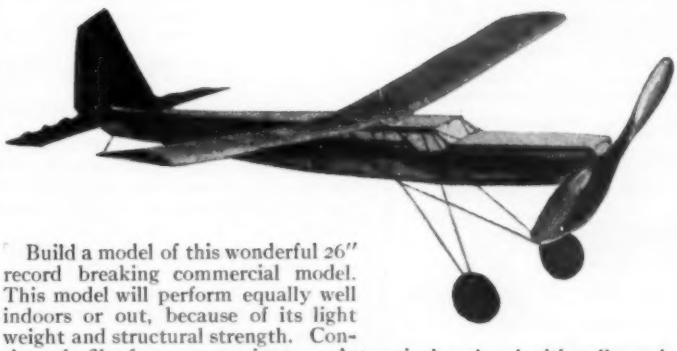

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in that position. Now cover the small openings with tissue and dope with banana oil.

### Coloring

The Lockheed Sirius is beautifully colored as follows: The fuselage and landing gear are colored with black dope, while the wings and tail surfaces are orange. The strips on the side of the fuselage and wheel streamline are bright gold with a silver propeller. License numbers and other identifications are painted in black on the wings and in orange lettering on the rudder.

### Necessary Materials

| | | | |
|---|---|---|---|
| 5 pieces | 1/16" x 2-1/2" x 12" | balsa | formers, ribs |
| 3 pieces | 1/32" x 2-1/2" x 12" | balsa | formers, side panels, etc. |
| 2 pieces | 3/8 " x 3/4" x 5-1/4" | balsa | cradles |
| 2 pieces | 1" x 2" x 3-1/2" | balsa | wheel streamlines |
| 1 piece | 1/8" x 1-3/4" x 4-1/2" | balsa | streamline covers |
| 3 pieces | 1/2" x 1/2" x 1" | balsa | T blocks and tail piece |
| 1 piece | 3/8" x 3/8" x 1-3/8" | balsa | head rest |
| 2 pieces | 1/8" x 3/16" x 12" | balsa | leading edges |
| 2 pieces | 1/8" x 1/8" x 12" | balsa | trailing edges |
| 1 piece | 1/8" x 1/4" x 12" | balsa | landing gear braces, struts |
| 1 piece | 3/16" x 3/8" x 12" | balsa | landing gear V struts |
| 1 piece | 9/16" x 1-3/16" x 8" | balsa | propeller |
| 4 pieces | 1/8" x 12" | round wood | main spars |
| 1 piece | 1/8" x 8" | round wood | elevator spar |
| 1 piece | 1/8" x 1/4" x 12" | spruce | motor stick |
| 3 pieces | | split bamboo | stringers, etc. |
| 1 piece | 3" x 3" | sheet celluloid | windshields |
| 1 pair | 2" | celluloid wheels | landing gear |
| 2 feet | No. 14 | music wire | fittings and clips |
| 1 large | | thrust bearing | propeller bearing |
| 2 | 1/4" | copper washers | propeller washer bearings |
| 1 sheet | 20" x 30" | Japanese Hack-one tissue | coverings |
| 2 pieces | 1/8" - 2" long | aluminum tubing | spar sleeves |
| 10 feet | 1/8" | flat rubber | motor |
| 1-1/2 oz. | bottle | ambroid | gluing, etc. |
| 1-1/2 oz. | bottle | banana oil | doping, tissue fastening |
| 1-1/2 oz. | bottle | black dope | fuselage |
| 1-1/2 oz. | bottle | orange dope | wings, tail surfaces |
| 1-1/2 oz. | bottle | gold dope | fuselage strips |

## Wings on a Battleship

(*Continued from page* 13)

exhibition of stunt flying. He was glad for the time in the air for now, for the first time, he was getting the feel of his plane, and really testing her.

It was a beauty, and responded to his slightest touch. What power, what ease, what stability she had! Never before had he piloted such a superb machine. Like a veritable eagle of the sky he dived, zoomed and spun, reveling in the chances that he took. But in reality, Bob did not consider them chances, such was the confidence he had in his own skill and in the plane.

THERE was the landing on the deck of the *Saratoga* to be accomplished. It would be more difficult now that the ship was at sea than it had been when she was lying at anchor in the placid waters of San Diego harbor, but his spirits had soared too high with his craft in the clouds, to worry about landings.

Out of the sky he swooped in graceful spirals and before even the deck crew were aware of his intention, he brought his throbbing plane to a perfect landing. No trouble this time and with a happy smile of triumph, Bob climbed from the cockpit.

All his fellow officers met him with pleased smiles and words of congratulation. Not "Old Tradition," however. He again held his few remarks until all the ship's officers were assembled for dinner. The meal passed uneventfully and then, just as he rose to leave, Captain Russell spoke.

"So you're proud of yourself, eh? All those monkey-shines up in the air don't mean anything. Trick stuff. Show-off stuff. What's the good of it?"

Bob's face flamed scarlet in anger. It was with the greatest difficulty he restrained himself from a hot, hasty reply. "Old Tradition" turned on his heel and left the mess without another word.

The next day, targets were towed out and anchored, and Bob took to the air well loaded with sandbags. He went through the various maneuvers with perfect technique and out of a possible score of twenty

made fourteen clean hits. It was good work, he knew, whether Captain Russell admitted it or not.

He returned to the *Saratoga* and landed his plane without a hitch. No word came to him from "Old Tradition." "Maybe," Bob thought, "after that target practice, the Captain is beginning to realize just what an airplane can do." His expectant hope was short-lived however. Later that evening, in passing his commander's quarters, he heard Captain Russell's rasping voice.

"Easy stuff. Anybody can hit an anchored target. That doesn't mean anything."

Bob ground his teeth.

Another week completed the maneuvers and the fleet headed back for San Diego. Still Bob had not found his chance to prove conclusively to the obstinate Captain Russell the value of himself and his plane.

A few days out from port, off the rocky, treacherous coast of Lower California, they ran into heavy weather. Early in the morning a strong breeze sprang up from the southeast and by noon it had reached hurricane proportions. The *Saratoga* plowed gallantly through the heavy seas, shouldering the tremendous breaking waves off her decks as if they were sea-foam. By nightfall the sea was running in mountainous ridges and even the mighty aircraft carrier seemed dwarfed as she wallowed in the trough before climbing the crests.

With an ever-increasing fury the wind blew. Men in glistening oilskins scurried around the deck from one sheltered point to another. Bob watched the storm increase in fury. It was magnificent—perfect. He reveled in its gigantic strength and thrilled to the ever-forward urge of the mighty ship under him, disdaining the worst the elements could do. It was a thrilling spectacle to see a handful of puny men conquer all the furies of the elements.

Night came. No light penetrated its murky gloom. "Old Tradition" kept to his bridge, eyes straining over the forward deck. It was a treacherous coast indeed and then, then, even as he gazed shoreward, the thing he dreaded most settled slowly down on the ship.

Fog!

A THICK impenetrable fog blanketed the heaving ship like a pall. The engines were slowed to half speed. The deep, base note of the fog siren screeched warningly into the gloom, but on they went. Each man stood ready at his post. For another half hour they ploughed through the pounding seas. The fog thickened.

A warning cry from the lookout. A quick command. A scurry of feet but, though the men thought and acted at the same instantaneous flash, they were too late. 'Crash! There was the agonized sound of wrenched, steel plates. The *Saratoga* trembled in her surge down the oncoming wave and hug motionless in midair.

Some ship had crashed into her stern and they hung together there for an instant. Before the resounding noise of the crash had died, "Old Tradition" was on the aft deck. In a moment the vessel that had cut into his stern had sheered off to disappear in the engulfing gloom.

Men rushed across the sea-swept decks, defying death itself in the performance of their duties. A hurried examination revealed that the damage was not so serious as was at first feared. The two ships had only struck a glancing blow and well astern.

Again the engines were started but the *Saratoga* did not answer her helm. In the sharp collision her rudder had been disabled. Lights, signals, flashed in the gloom but they failed to penetrate the murky gray. Messages over the wireless sizzled into the night. And all the time the *Saratoga* drifted before the gale in the clutches of the turning tide, toward the shore with its yawning, crushing rock. No ship could live there long!

SEAS toppled over her and pounded her decks. Without headway or steerage way, she wallowed helplessly in the trough of the sea. Then came sparking messages out of the ether. The *Tennessee* was standing by to take on a line. How was it to be accomplished in that raging sea? It was only with the greatest difficulty, as the ship careened, that one maintained a precarious foothold on her sloping deck.

It was impossible, of course, to launch a boat. Nothing could live a minute in that sea. A line could be thrown but then—where to? Nothing was visible beyond the decks of the disabled man o' war. Steadily she drifted, drifted towards the rocks and disaster. No other ship of the fleet would dare to approach them close enough to make the heaving of a line between them feasible. That would only invite another collision. There seemed nothing to do but to wait for the inevitable.

"Old Tradition" stared straight ahead. Already in his mind, he heard the pounding of the surf on the rocks toward which his disabled ship was drifting. In those few, bitter, helpless minutes, all his life—all the old tradition that meant so much to him—went through his mind. To lose his ship; it was more than he could bear.

Then, while the raging seas tossed the helpless ship to her doom, inspiration came to Bob McAllister; inspiration and with it his chance to redeem not only himself but the entire service he had so proudly sworn to uphold.

He fought his way across the storm-swept deck to Captain Russell's side. Raising his voice above the din of crashing seas, he shouted in his ear.

"I'll get a line aboard the *Ten-*

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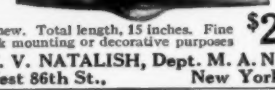

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*nessee* for you, sir, by plane."

At his voice "Old Tradition" looked up with a haggard eye.

"How?" was all he said.

"I'll fly from here over to the *Tennesssee* with a line, drop it aboard and then they can haul in our cable."

He spoke eagerly. He itched for action.

As the sense of his words drifted into Captain Russell's tired brain, the fighting glint came again into his eyes.

"Do you think you can do it?" he bellowed above the cry of the wind.

"I can only try, but I think I can, sir!"

With one sweeping gesture "Old Tradition" took in the raging chaos about them.

"Good heavens, lad, I can't let you go. It's murder. No aircraft ever built could live in that gale."

"I can live long enough in it to get a line aboard the *Tennessee* and that's all that matters."

"Old Tradition" looked Bob in the eye. Suddenly he took his hand and gripped it for a long moment.

"You are right, Mr. McAllister, that is all that matters."

They jumped into action. In a trice the hatch was opened and Bob's plane hauled on deck. A hundred eager hands wheeled it into position. Bob jumped into the cockpit.

"Contact!"

The surging roar of his motor came to his grateful ears like sweet music. He jazzed the throttle. His keen ear soon told him that she was hitting perfectly. Tonight he would need every ounce of power in her and he would use it too.

THE terrific wind tore at his wings. It screamed in a wild tempest through the struts of his plane. The deck heaved and tossed, while the storm did all it could to wreck the ship even before it rose from the deck. Bob did not mind. Action, action—that was what made life worth living when one was young. He had confidence in his motor and in his skill. That should be enough! Surely, the word "failure" is not in the lexicon of youth.

His plan was simple. A roll of light rope was brought on deck and made fast. Clever fingers saw that it would not foul but would follow free. In the bottom of his cockpit where he could reach it in an instant, Bob curled some hundred feet of slack line, the end heavily weighted.

If all went well he would fly from the *Saratoga* and as he rose the coil of rope on the deck would pay out as he flew. Then, when he was above the *Tennessee*, it was his task to drop his hundred feet of slack line onto the deck below. To miss meant failure. He had to get his line aboard the *Tennessee*.

Simple in theory, but, oh, how difficult in execution. Everything was ready. The plan of action had been wired to the *Tennessee*. She was now standing by, waiting to take in the line dropped by the airplane. Bob crouched tensely in the cockpit waiting for one of those infrequent moments when the *Saratoga* between rolls, should achieve, for a slight second, a level deck.

The flashing instant came and at Bob's upraised hand the chocks were pulled away and the plane was clear. With a roar of engine that even silenced the raging storm, the plane leaped into the air

To Bob, in his swaying cockpit, all hades seemed loose about him. He worked the controls with a desperate sureness. Gusts of furious wind frantically wrenched at his wings. The fog about him seemed to have a definite density as he strove to pierce its gloom. For a moment fear entered his heart.

NOT fear for his life for he never even thought of that, but fear that he might fail. He pictured the *Saratoga* on the rocks pounded by the surf and then, with a physical effort, he banished the grim thought from his mind. He must concentrate on his plane where all his skill was needed.

Through the dense fog he flew. For all he saw, he might have been suddenly struck blind, so completely walled in was he by the swirling vapor. He banked and turned. He pierced the gloom beneath him but saw nothing. He must find the *Tennessee!*

He dropped still lower, dangerously low, running the great risk of crashing into her masts, but even that would be achievement. He determined to do that very thing, if no other way presented itself to him, to get his line aboard. Again he banked, and circled low, ever lower. He dare not fly too far he knew, for if the reel of rope should all pay out it meant disaster with nothing accomplished. Somewhere below him, waiting eagerly with straining eyes and eager hands was the crew of the *Tennessee*. Lower! He must find her!

A kind providence must have come to his aid, for at that minute the fog lifted slightly. Leaning far over the cockpit, Bob discerned in the gloom below, directly beneath him, the dim outline of a mighty ship. He zoomed sharply. Up, up, straight up, he went until even his mighty Whirlwind engine stalled. Back the plane slid and then with a clever hand on the controls, Bob eased his ship into a side-slip. Like the very fury of the storm, he fell straight for the deck of the battleship. A scant hundred feet above her deck, he heaved out his weighted line to the eager hands below, and then went careening on into the drunken storm as the fog again settled over all.

It was only the combination of skill and luck, tempered by a tremendous upsweeping current of wind, that saved Bob from crashing on the deck of the *Tennessee*, or into

the raging, frothing sea. He never could tell afterwards just how he managed it, but even as he felt the salt spray in his face, he righted his plane and coaxing the last ounce of energy out of his engine, zoomed upward to safety. He circled about a few times to steady his nerves and then headed back for the *Saratoga*.

A feeling of triumph surged in his heart. Already, he knew, the glad news had been flashed to his ship. Already, he knew, strong and willing hands were hauling on board the cable that meant salvation for the man o' war and all aboard her. He had succeeded. Now what would "Old Tradition" . . .

Bob never finished the thought for in that moment there loomed directly ahead of him in the murky gloom, the towering foremasts of a ship. He jerked back on his stick but it was too late. A sickening crash—a blinding light, and then utter darkness.

Later that night, when the *Saratoga* was riding safely at the end of a long tow cable, "Old Tradition" went below to the hospital bay. Ensign McAllister lay in bed swathed in white linen. Many bottles stood on the table by his side and the strong odor of chloroform hung heavily in the room.

Bob looked up as Captain Russell entered and followed him with his eyes till he stood by the bedside. "Old Tradition" looked down at the boy. There was a choking feeling in his throat. The man and the boy gazed in silence at one another, and a light of understanding passed between them. Though it was against all tradition, Bob was the first to speak.

"Well, he said weakly, "do you still insist. . . ."

He smiled as his voice trailed off into nothing.

Captain Russell smiled, too, and Bob was surprised to see how really decent the old man could be.

"Son," there was a warmth in "Old Tradition's" voice that very few had ever heard. "Son, I'm sorry. I was wrong. The navy can't do without you boys. You're part of us—one with us—part of the old tradition."

Their hands met in a long, silent grip.

## A Course in Airplane Designing

(*Continued from page* 40)

Now for the first method of estimating the necessary wing area. This method is easy, but not very accurate. It is only used on models. For ships of reasonable weight, having wings of aspect ratio five or six, the wing should be about one and a quarter to one and one-half times as long as the fuselage, including the tail and the propeller.

For example, if we have a fuselage that is twenty inches long, with tail surfaces that extend an inch beyond the tail post, and a prop that extends an inch beyond the first bulkhead, we will need a wing that is one and one-quarter times twenty-two inches long. This gives us a wing twenty-seven and a half inches long.

If we are using an aspect ratio of five, the wing should be five and one-half inches wide, or should have a chord of five and one-half inches. This is obtained by dividing twenty-seven by five.

This method gives us a wing slightly shorter in proportion to fuselage length than those used on man carrying ships, but models that are powered with rubber motors need a long fuselage to take care of the long motor. When using this method it is best to make the wing a little larger than calculated, to be "on the safe side."

The second method is more exact, but also more difficult. It deals with a formula. We first assume that the lift of the wing is equal to the weight of the ship, then we estimate the total weight of the ship, as it will be when ready to fly.

For instance, if we estimate the weight to be four ounces, we write down "Weight, complete, four ounces." The formula to be used is $L=K\ AV^2$. Since we assume the lift equal to the weight, we can substitute the weight for L, or lift, in the equation. Then we have, $W=Ky\ AV^2$. The symbols are:

L=lift in pounds.
W=weight (in this case, two ounces).
Ky=a coefficient determined by the designer of the wing curve. This value is obtained from charts that are prepared for every wing curve. These charts may be secured from the National Advisory Committee for Aeronautics.
A=Wing area in square feet.
$V^2$=speed of the ship in miles per hour, squared (Multiplied by itself).

The speed of the ship requires more estimation. Most models fly at speeds between fifteen and forty miles per hour.

If we want the ship to fly slowly we use the lower speed, say fifteen miles per hour. This we square, giving us 225. Then we look at the wing section chart to find the value of Ky. We find it plotted against the angle of attack. As our ship will fly best at an angle of attack of about two degrees we find the Ky to be .0013, (using a Clark W wing section).

We now set up our formula, remembering to change the weight to pounds, as the value of L is in pounds. Four ounces is a quarter of pound. Then we write down the equation:

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$$.25=.0012 \times x \times 225.$$

This leaves us with our x on the wrong side, so we bring it over in the original formula, making it,

$$A=\frac{W}{Ky \times V^2}$$

Substituting, x (or A)=.25÷ by the quantity .0012 × 225.

x=.93 square feet, wing area required for flight.

Changing this to square inches we have 133.92 square inches.

In using this method one must be sure to get the value of Ky from the chart, as there are several other values given that do not concern us at present. Some charts use the coefficient $C_L$, called the absolute coefficient. To change this quantity to Ky, divide it by 391.

The second method I have outlined should not be attempted by those who have not had enough math to deal with it, because they will only confuse themselves and waste time on it, while they could use the first method more successfully.

Make yourselves familiar with the two methods, or with either of them, and then see what you can do with these questions.

### Questionnaire

1. What is the result of using a wing too large for the ship?
2. What is meant by the term "span"?
3. What is meant by the term "chord"?
4. What is meant by "aspect ratio"?
5. A wing is thirty-six inches from tip to tip, and has a chord of six inches. What is the aspect ratio?

## Learning to Fly a Glider

(*Continued from page* 17)

to take a ride in a glider. When invited to go up in a machine belonging to Gliders, Inc., at Detroit, she accepted by promptly hopping in. The day was ideal. The glider resting on the snow, she was launched in the air and rose gracefully, dipped, banked and made a perfect landing several hundred yards away.

THERE are several organizations now getting in action to assist those who would take up gliding. The National Glider Association, Inc., Union Trust Building, Detroit, Michigan (Donald F. Walker, Manager), has the endorsement of the National Aeronautic Association and the F. A. I., or Federation Aeronautique Internationale. A glider is furnished to members of the Association who have banded together with one or more persons experienced in the design and construction of aircraft.

"We do this," Mr. Walker told me, "because we believe or, rather, know that a glider is a motorless airplane, in every sense of the word, and its construction should not be attempted by amateurs except under approved and experienced supervision. A charge of five dollars is made for the blue-prints for a Primary Training Glider, including a bill of materials. Standard airplane practice in construction is recommended.

"The plans are based on the German 'Zoegling', with modifications to meet American supplies and practice. We will later have plans of a Secondary Training Glider which, likewise, will be based on the German 'Pruefling', redesigned for American use. The redesigning is done under the personal direction of Dr. Wolfgang Klemperer of Akron, Ohio, and is checked by Professor Peter Altman of the University of Detroit, and other members of the committee. Other training planes will be available as new details are worked out by American universities, technical high schools and clubs.

"You may be interested in knowing that Franz Gross, the designer of the last 'Darmstadt', is now located in Akron and, among his other activities, is building the 'Akron', which will be a highly refined 'Darmstadt'."

This N. G. A. is a non-profit association, engaged in the promotion of motorless aviation. It was founded and is headed by Edward S. Evans, Chairman of the Aircraft Bureau of the Detroit Board of Commerce, who is connected with several aviation companies. Some of the leading aviation authorities in the United States are associated with him, including leaders in boys' work and sportsmen. A number of clubs are affiliated with the N. G. A.

The California Glider Club was the first N.G.A. group to get a glider in the air. Thomas D. Stimson, of Seattle, has made numbers of glider flights and, with the exception of the Wright brothers was the first in this country to soar in an American designed and built glider. Gliders, Inc., Orion, Michigan, are said to be the first manufacturers engaged solely in making gliders.

"FOR simple gliding," says Mr. Walker, "we recommend two types of ships, both monoplanes, both equipped with standard airplane controls, and both so built as to design, materials and workmanship as to be highly stable and safe. A glider of this type is not a plaything. It cannot be safely built by anyone inexperienced in airplane construction. They are offered for sale by manufacturers at from $500 to $600 f.o.b. factories. These gliders will fly as simple gliders just as well as the pilot knows how to make them, and when he is sufficiently skilled,

they can be soared very successfully.

"The first of these ships, and the one priced above, is the Primary Training Glider. It has an open lattice-work fuselage and a square-tipped wing about 32 feet in span, with an aspect ratio of about 7. (Aspect ratio is the wing span divided by width or 'chord'.) It is so stable that if the beginner does not know what to do, he can place his stick in neutral and be sure that his glider will settle down without damage to anyone. The secondary ship is very similar to the primary ship but has an enclosed fuselage and a higher performance.

"The National Glider Association is prepared to send to its members written directions on how to select terrain for gliding, and how to fly a simple glider. These ships are launched with the aid of a rubberized rope fastened in the middle to a hook in the nose of the glider. About eight to ten men are needed in the ground crew, so that, as a sport, gliding lends itself particularly to club action.

"Persons with the experience and skill necessary to build an airplane can secure plans of a simple glider from this association by forming a club or taking out an individual membership, and by paying the actual cost of the blueprints. These blueprints have been approved by the N. G. A. Technical Committee."

Mr. Evans has offered a trophy to be awarded each year to the club or member winning the national contest in gliding. In addition, prizes totaling $3,000 are offered for duration flights in motorless airplanes. A first prize of $2,000 is offered for the first ten-hour flight under official observation to be made by an American citizen. Prizes of $100 per hour for each hour in excess of ten hours, up to a total of twenty hours, will be paid by Mr. Evans.

Those who look upon gliding as merely a sport, with but little relation to real flying are reminded that in Germany *transport pilots must be glider graduates before they can receive their flying license.* Glider pilots are said to be exceptionally good airplane pilots.

Dr. Wolfgang Klemperer, veteran glider pilot and holder of the glider license No. 1 of Germany, now connected with the Goodyear Zeppelin Company here, says of gliding:

"IT is an unrivaled sport. I am unable to describe by words the sublime pleasure one experiences in gliding over hills and valleys, silently, like the eagle, cruising or hovering, rising or descending at will. The ample controllability makes you feel like a bird, master of the air.

"The constant alertness, watching for favorable air currents and studying their relation to the varied scenery below, provides thrill and challenge. A few weeks in a glider camp is outdoor life in the world's fullest meaning. Soaring flight requires also a certain amount of scientific training, engineering sense, and physical skill. Thus it most perfectly blends all the elements requisite for a recreational and educational sport such as the rising generation so appreciates."

The American Motorless Aviation Corporation organized its first glider school on July 8, 1929. The gliding field is at Cape Cod, where the three German gliding experts made their records in 1928. Instruction is divided in ten, twenty, thirty, and ninety-day periods, and the rates include board and room, as well as flying, ground work, shop work and recreational programs.

The machines used by the AMAC, as it is called, are claimed to hold all world records for engineless airplanes. The Darmstadt type of gliders have flown fourteen hours without landing, carried a passenger for nine hours, traveled cross country fifty miles, and climbed to a quarter mile above take-off with no power but the winds. The AMAC is the United States representative of the Rhoen-Rossiten Corporation, which controls the activities of the Darmstadt type of glider in Germany.

THE office of the American Motorless Aviation Corporation is at 7 East 42nd Street, New York. Daniel Rochford is the representative of the Cape Cod Glider School at Boston Airport, Massachusetts.

The Glider Division of the Aero Society of the University of Michigan has purchased a glider and members are using it for flying instruction. It is of the conventional type of training glider; a high-wing monoplane with open fuselage. The wing span is 34 feet and the chord 5 feet. The tail surface is about 13 per cent, and the weight empty about 220 pounds. This type of glider may become the vehicle of inter-collegiate rivalry in gliding and soaring, steps having already been taken in that direction.

The Glider Club of Wisconsin was recently organized and is building two gliders. Clubs have been formed in Kansas City, Cleveland, Cincinnati, and a number of other places. A third association, the Pioneer Glider-Soaring Clubs of America, has recently been organized, sponsored by James C. Penney, Jr., who financed the glider flights by the Germans brought over in 1928.

In May, 1929, several thousands gathered to witness the first glider meet in this country, held by the Long Beach Glider Club of California. On the opening day the primary type race was run. The gliders were catapulted in the air from a 150-foot rubber cord. Ray Chesley stayed aloft for 9.4 seconds and covered 350 feet. On the second day he increased his time and distance. Others were about the same in both time and distance covered.

These are indications of the wide interest which has been aroused in

(*Continued on page* 69)


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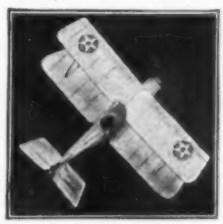

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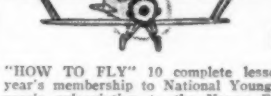

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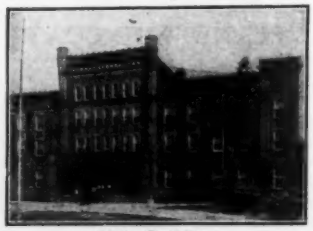

Main Building

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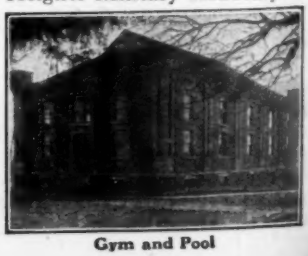

Gym and Pool

(*Continued from page* 67)

gliding. Scores of clubs are in active swing and hundreds of young people are learning how to fly. It is noted by experts, incidentally, that a wind is not necessary for gliding. The wings support the plane in calm air, as it slowly glides downward.

A gentle or brisk wind affords more support and greatly increases the distance covered. Snow has been found ideal as a landing ground and gliders are flown very successfully in mountainous Switzerland. Sand and soft ground make ideal landing spots, but in Germany the favorite gliding hills are rocky. It is possible to land without even the slightest jar by suddenly tipping the wings backward, just as contact is made with the ground. A bird does this for the same purpose of exposing a large surface of wing to the air, as a brake.

The day of real flying is at hand. The glider opens the door for great numbers who cannot afford or are too young to join the flying schools. Thousands of these aircraft will be seen in this country in the next few years. The glider is ideal in developing the sense of "teamwork," as several people must work together in getting plans, constructing a machine under expert instruction, and in launching the completed craft.

BUT once in the air, the pilot depends on his own mind and muscle. He learns to think for himself, to master his machine and the forces acting on it. He becomes self-reliant, and best of all, he learns how it feels to ride the air waves and control a "flying machine."

In years to come, the young man who cannot glide and pilot an aircraft will be almost as much "out of the swim" as is the boy who knows nothing today about a motor car. It will become as commonplace to go out for a glide as it now is to motor around the crowded streets. And the air will never be as likely a place for accidents—for there one can maneuver in *any* direction—up, down, sideways.

The Air Age is already with us. It is simply up to us to join the growing procession of those who fly. The sooner we start, the sooner we shall be known as "airmen," with all the honor and the privileges that go with this newest and most thrilling of all careers. The glider offers a highly satisfactory way to begin "getting off the earth" into the clean, fresh air of the world above the world.

Many, perhaps, do not know that the Department of Commerce has recently given official recognition to gliders and gliding, by providing for the grade of "glider pilots," requiring physical examination as for private pilots, and prescribing tests as follows:

"GLIDER PILOTS. In addition to normal take-offs and landings, a series of gentle and moderate banks, together with precision landings, will be required."

# The Macfadden Aviation Advisory Board

(*Continued from page* 50)

the *Graf Zeppelin*, while having nearly twice the gas capacity. The American dirigible, however, will be thirty-four feet greater in diameter, giving it an aspect ratio of 5.9 as against the 7.7 of the *Graf Zeppelin*. Contracts for the building of these two monster airships were awarded by Congress in 1927 to the Goodyear-Zeppelin Corporation of Akron, Ohio.

### Gliders

GLIDERS was another question which appeared to interest our readers greatly. This great sport is now coming to the forefront rapidly. An American Glider Association has been started, in Detroit, which shortly is undertaking a nationwide campaign to boost "sail flying". Messrs. Evans, Griffin and Betts, of the Detroit Aircraft Corporation have the matter in hand and have already arranged for two demonstrations.

One of these will be a flight from New York to Washington of an airplane, behind which will be towed three gliders. One of these gliders will be released over Philadelphia, the second over Baltimore and the third over Washington. They will be brought to land at the airports in question.

Shortly after this, Captain Frank Hawks of trans-continental flight record fame will, it is understood, endeavor to tow a glider across the continent and return. How far this sport is progressing is further demonstrated by the feat of Edward B. Heath of Chicago, who recently looped in a glider. He was towed by an airplane and released at 1,200 feet. During his descent he made four complete loops before landing.

BELOW is continued our list of planes used in the World War.

### German (Continued)

Aviatik biplane, Benz and Mercedes motors, 220 h.p.
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Operate a model airplane supply store in your home. Make real money—you can sell your friends, model clubs and others, standard model airplane kits, models and supplies and make a BIG profit. We want one dealer in every neighborhood. This is your BIG CHANCE to own a business of your own. Be first in your city.

NOTE THIS BARGAIN SAMPLE OFFER TO HELP YOU GET STARTED

2—No. 1 Clinton Ready-to-fly Fokker Models at $2 each. Total ..... $4.00
2—No. 2 Clinton Ready-to-fly Deluxe Models at $3 each. Total ..... 6.00
3—EAGLET Duration model const. sets at $1 each. Total ..... 3.00
3—Falcon low wing model const. sets, at $1.50 each ..... 4.50
Big display box of 50 standard model air plane parts ..... 5.00
50 illustrated (in colors) catalogues and order blanks ..... 5.00

You sell them for a total retail value of $27.50

Our special introductory price to you on the above order is only $14. *Your profit is $13.50.* GET STARTED NOW. On future orders we allow you a discount of 40% from list. This amazing offer is open only to May 25th, 1930, so rush your order at once. NOTE special FREE items which will be included with your order.

This ad. applies only to young men or women, clubs or groups who wish to either buy in groups or operate their own model supply stores. We positively cannot fill orders for single items listed above at these low prices. See Clinton and Eagle Model ads. on other pages.

—————COUPON—————

To Sales Manager
Eagle Model Airplane Co., North Haven, Conn.
Dear Sir: I ☐ We ☐ wish to purchase the above airplanes at your special introductory price. Please RUSH by express upon receipt of this order. Enclosed find check, money order for $14.00 in full payment. Send to

NAME.....
NUMBER..... STREET.....
CITY..... STATE.....

I understand that I will receive FREE with the above one rubber stamp for imprinting my name as dealer on catalogues, etc., and 25 letterheads and envelopes.

**BABY-BUG ??**
**SEE T. A. S. AD ON PAGE 63**

**AVIATION Information FREE**

Send us your name and address for full information regarding the Aviation and Airplane business. Find out about the many great opportunities now open and how we prepare you at home, during spare time, to qualify. Our new book "Opportunities in the Airplane Industry" also sent free if you answer at once.

**AMERICAN SCHOOL OF AVIATION**
Dept. 3154 3601 Michigan Ave., CHICAGO

Plywood—3 ply birch 3/32" x 10"—any lengths—per square foot—30c.
Balsa Wood — All dimensions — Sample price 1/6" x 1/8" x 36"—9c—send for price list.

**MOSKITO SKELETON PLANE**

Senior—will fly 4 to 5 minutes—$1.10 prepaid
Junior—will fly 2 to 3 minutes— .55 prepaid
Stamps accepted.

**MONUMENTAL AIRCRAFT CO.**
435 Equitable Bldg. Baltimore, Md.

**GET READY NOW**

for the contests this summer. Time and patience in building your contest model may win a valuable prize for you. Do your experimenting now. Compare our prices with any others. Then send in your order—but please do not send stamps.

**Some of our everyday bargains**

RUBBER—The finest grade obtainable. Guaranteed fresh. 1/8"x1/32", 50 feet $.30. FULL 225 FOOT SKEINS $1.00.
UNITITE CEMENT—The new recently developed quick drying cement. Transparent. 2 oz. can $.25.
BALSA—Selected stock. Piece 1"x3 1/2"x42". $.60.
JAPANESE TISSUE—21"x31". 5 big sheets for $.22.
DOPE—Finest solution for Jap. Tissue. 1/2 pt. $.40.

*Send 2c stamp for bargain price list*

**Universal Model Aircraft Co.**
2905 East 33rd St. Kansas City, Mo.

**American Sky Cadets**

Make Our Stores
YOUR HEADQUARTERS
Our New Spring Price List
Is Just Hot Off the Press.
NEW CLEAN STOCK
More of It and
BETTER PRICES
Send 10c in Coin—Money Refunded
With First Order.

*See Our Big Special*

$5.00 worth of wood, wire, paper, glue, dope, etc., for only $4.00.

*30 DAY OFFER*

**South Haven Model Airplane Supply Co.**

**South Haven, Michigan**

FLYING CLUB PINS . . . . 35¢
FREE CATALOG

Design Shown silver plate 35 cents each, $3.50 doz. Gold plate or sterling silver 50 cents each, $5.00 doz. Made with any 6 letters or less; 2 colors enamel.

BASTIAN BROS. CO. 539 Bastian Bldg., Rochester, N. Y.

6 Ft. LONG

FREE!

Large 6-foot air bag with inflators, parachute and complete instructions for flying. Send name and we'll send 6 of our new reprints of wonderful oil painting pictures to dispose of on special 25c offer. Send $1.50 you collect and for this service we will send this wonderful Airship with instructions free.
C. M. THOMAS, 337 W. Madison St. 4-K-9 CHICAGO

**Model Airplanes**

| | |
|---|---|
| Curtiss Hawk Kit | $2.25 |
| 40" Twin Pusher Kit | 2.00 |
| Small Commercial Kit | 1.25 |
| Baby R. O. G. Kit | .40 |
| 6 Large Jap Tissue | .25 |
| 1/8" flat Rubber, a skein | .85 |

Postpaid. Add 5c. for insurance.
"Quality Materials at Lower Prices"

SOUTHERN MODEL AIRPLANE SUPPLY CO.
259 Fifth Street, N. W. Atlanta, Ga.

**MODEL AIRPLANE NEWS**

**PLANS AND PARTS**

THOSE who wish to purchase parts for the construction of models, or blueprints, will be furnished with the name and address of the company which stocks them, upon request for this information from the reader. Address the Editor, MODEL AIRPLANE NEWS, Macfadden Publications, Inc., 1926 Broadway, New York City.

Benz engine. Machine gun at right of motor. One bomb release for six bombs

D. F. W. biplane, Type C.37 III, 220 h.p. Benz engine

Friedrichshafen single-seater fighter

Friedrichshafen seaplane, Type FF67 used extensively in the North Sea operating from land stations and seaplane carriers

Friedrichshafen 3-seater, two 225 h.p. Benz engines

Friedrichshafen twin-engined tractor biplane, Type FF62, two 260 h.p. Mercedes engines

Fokker single-seater biplane, Type D.7, 160 h.p. Mercedes engine

Fokker "parasol" monoplane, 200 h.p. Goebel rotary engine

Gotha twin-engined pusher, 3-seater biplane, used largely for raiding purposes, two 260 h.p. Mercedes engines

Gotha single-seater biplane, small rotary engine and Morane bodied Falke

Halberstadt two-seater fighter biplane, 180 h.p. Mercedes engine

Halberstadt two-seater Type C.L., IV, 180 h.p. Mercedes engine

Hannoveraner biplane, two-seater fighter, 180 h.p. Opel Argus engine

Brandenburg sea monoplane

Junker all-metal (aluminum) monoplane

All metal, wireless Junker-Fokker monoplane, Type CLI, 160 h.p. Mercedes engine

Roland single-seater fighter biplane DII, 160 h.p. Mercedes engine, (Two Spandau machine guns operated by the motor)

Roland triplane, Type DIV, 160 h.p. Mercedes engine

Roland single-seater "wireless" biplane, Type DVIII, 190 h.p. B.M.W. engine

An experimental Roland "D" type, single-seater biplane, 160 h.p. Mercedes engine

Roland single-seater fighter, type DXIV, 160 h.p. Goebel engine

*(to be continued)*

---

Other questions are answered as follows:

Claim is made by the British Royal Air Force for the speediest single-seater fighter now in operation. The machine is a Fairey Rolls-Royce which, during test flights, averaged 200 miles an hour with full military load.

*Dear Sirs:*

*I would like to know how to make scale models. For instance; the fuselage is 16 inches, how can you find the length of the wing on stick and cabin planes?*

*Yours truly,*
SOL WOLFSON,
*531½ W. Berks St.,*
*Phila., Pa.*

Answer:

In making a scale model of a plane, make your fuselage two-thirds the size of the wings. For instance, you say your fuselage is sixteen inches long. In order to balance properly, your wing spread should be twenty-four inches. These proportionate dimensions follow in general on all types of planes.

*Dear Sirs:*

*Please answer the questions I am going to ask you.*

*1. Who was the first one to fly over the ocean, Lindbergh or Walter Hinton?*

*2. What is a biplane?*

*3. What is a monoplane?*

*4. What is a three point landing?*

*5. What is an amphibian?*

*Yours truly,*
FLOYD P. STEVENS,
*3246 N. Crawford, Ave.,*
*Chicago, Ill.*

Answer:

Walter Hinton flew the Atlantic in 1919, a number of years before Lindbergh's feat. Also in 1919 there occurred the first trans-Atlantic nonstop flight by Captain Sir John Alcock and Captain Sir Arthur Whitten Brown.

A biplane is an airplane with two main supporting surfaces placed one above the other.

A monoplane is an airplane which has but one main supporting surface, sometimes divided into two parts by the fuselage.

A three point landing is a perfect landing in which both wheels and the tail skid touch the ground at the same instant.

An amphibian is an airplane designed to rise from and alight on either land or water.

*Gentlemen:*

*Would you please tell me what the rod extending from the right wing of a monoplane is used for?*

*Yours truly,*
LOUIS MADEIRA,
*310 East New St.,*
*Lancaster, Pa.*

Answer:

The rod to which you refer as extending from the wing of a monoplane is called the Pitot. This is used in conjunction with the air speed indicator, which, of course, makes known to the pilot the speed at which his plane is traveling through the air.

*Dear Sirs:*

*I have been very interested in army airplanes. I saw in a moving picture some army airplanes with a slotted nose. Would you please tell me what that means?*

*Yours truly,*
PAUL M. HOLMES,
*1103 Beaver St.,*
*Parkersburg, W. Va.*

Answer:

We take it that you mean slotted wing. These are being built on the Vought Corsair army and navy fighters and are a contraption designed to eliminate stalling in an airplane. To date they have proved to

be decidedly successful, in fact to such extent that several of the twenty-six planes originally entered in the Guggenheim $100,000 safety competition were fitted with these wing slots.

*Dear Sirs:*

*I am constructing a four foot model of a Rohrbach Romar German seaplane and I would like to know a few things about it before I start building it.*

*First, how many persons does it carry, including pilots, mechanics and passengers.*

*How many windows does it have and on which side are the doors? Can the pilot open the front windshield and get out?*

*How is the plane painted; what color and how is it trimmed? Is the plane covered with all metal?*

*Why is the wing slanted up so much?*

*Yours truly,*
ROBERT GILMORE,
*1137 East Center St.,*
*Springfield, Mo.*

Answer:

The Rohrback Romar is a twelve-passenger flying boat. Usually two pilots are carried and a flying mechanic. There are seven windows. Entrance is made through a door on the port, or left, side, just behind the trailing edge of the wing.

Yes, the windshield can be opened by the pilot.

The colors are silver wings with a white hull and a black border around the fuselage longerons up to the nose, and from the water line down the bottom of the hull it is black.

The ship is entirely all metal, built of duraluminum.

The slant of the wing, as you call it, is known as the dihedral. This is very marked in the Romar and affords the machine great lateral stability while in flight.

*Gentlemen:*

*As I live in the mountains of western North Carolina, I would like to know if it is possible to fly a glider here. The city golf course is the only place without trees where I could glide from one point to a lower one.*

*Another question, please. Are there upward currents of air near hills and mountains with trees on them, and if so, are they as great as if there were no trees?*

*Yours truly,*
EDMUND BROWN,
*Sylvia, N. C.*

Answer:

Yes, we see no reason why North Carolina should not be an admirable place for flying gliders, particularly when you come to think that Orville Wright and his brother built their first glider and from that, the world's first airplane at Kitty Hawk, N. C. May we suggest that you take particular care of what you do concerning the glider, as gliding, while easy to learn with proper instruction, is fairly hazardous when undertaken by persons without instruction. There are upward currents of air near all hills and mountains and forests; hence your question answers itself.

*Gentlemen:*

*Shall I put ambroid on the wing when I have allowed for the dihedral angle, to make it stay in that position?*

*My friend has an airplane and I think it has too much dihedral. It stays in the air about five seconds and then comes down. What will be necessary to make it stay up longer?*

*Yours very truly,*
THOMAS BREWSAUGH,
*1511 St. Clair St.*
*Covington, Ky.*

Answer:

It is usually found that the best means of affixing the dihedral on a plane is to cut deeply (being careful not to cut right through) both the leading and trailing edges of the wing at the center, then gently bend them to the required dihedral, placing a block under each wing tip to the amount of dihedral decided on. Then put the ambroid into the cavity caused by the cut and subsequent bending back of the wing.

*Dear Sirs:*

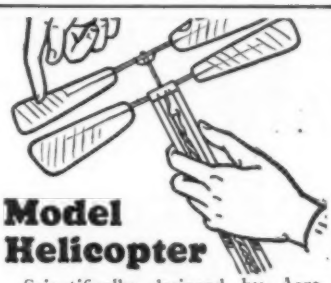
*I would like to ask a question about the resistance of an air-cooled motor. The worst form of streamlining there is, is a round form of strut or object. The air stream is opened up by the blunt nose and does not close up in the rear of the object, causing discontinuity and turbulence, consequently resistance. The best form of streamlining, on the other hand, consists of a blunt nose and a gradual tapering. This closes up the air stream and produces a minimum of turbulence.*

*In an object that is round, such as an air-cooled cylinder, I do not think that the rear receives much cooling due to the vacuum, while the front is cooled. Since the rear is not cooled to any great extent, why not streamline the rear of the cylinder? I have often wondered why the struts and various parts of a plane are streamlined and the air-cooled motors are not.*

*Yours truly,*
JOSEPH BERNOT,
*320 Power St.,*
*Brooklyn, N. Y.*

Answer:

Cooling, in this case, is caused by the flanges of the cylinder which, you will note, are very thin and, therefore, are acted on by the cool air much more quickly than something thicker. As the plane flies through the air, these flanges strike the cool air and the coolness is immediately transferred to the cylinder by molec-

**Model Helicopter**

Scientifically designed by Aeronautical Engineers. Expertly constructed so that it will not crack up.

The Helicopter has twin propellers which rotate in opposite directions, making for greater power and speed.

Made of finest grade materials. Motor made of specially compounded, compressed sheet rubber. Fuselage Frame, Select Kiln-dried White Cedar, Upper, Main and Lower Yokes, drawn and die-stamped Aluminum, Drive Shaft and Motor Connection, Oil-Tempered Alloy, Shaft Casing Nickeled Brass Tubing, Shaft Bearing Metallic, with anti-friction Bead. Length 18 inches, Width 11½ inches. Not a Kit.

Guaranteed to fly or money Refunded. Send 60 cents in stamps or money order to cover mailing and cost of Helicopter. Immediate Mailing.

TWISTUMS INC.
15 East 20th St., New York, N. Y.

**MODEL AEROPLANE SUPPLIES**

Send 5c for bundle of Balsa and Price List on Supplies.
AERO SHOP, 3050 Hurlbut Ave., Detroit, Mich.

**UNIVERSAL No. 2**

A perfected scale model that really flies 500 feet with easy, Un-breakable one piece construction, adjustable tail unit, red and gray lacquer finish, assembled in less than one minute without tools, toothpick propeller, that cannot wobble, and all of this in one plane for only $3.50 postpaid.

KAHN AIRCRAFT COMPANY
5710 Woodlawn Ave., Chicago, Ill.

**"HOOSIER" AIR EQUIPMENT WON ALL AIR MODEL PRIZES AT LOUISVILLE NATIONAL CONTEST**

THE HOOSIER WHIRLWIND COMPRESSED AIR MOTOR

WT. ONLY ⅜-OZ.
3-IN. DIAMETER
⅜-IN. BORE
⅜-IN. STROKE
STRONG AND POWERFUL

Counter balanced steel crankshaft. Unique. Flies 4½ ft. to 6 ft. models. Finished parts, easy to assemble, $2.00 postpaid. Completely assembled and tested $4.00 postpaid.
**CO2 PRESSED AIR TANK**—Gastweight seamless, high pressure, 3" diameter 20" long, $7.00 postp'd. 24" long $8.50 postp'd.
**MOTOR AND 24" TANK COMBINATION**—Wt. complete only 8¾ oz.! Send this ad. $12.00 postpaid.
**COMPLETE KIT FOR 5 FT. COMPRESSED AIR MODEL** with blueprint less tank and motor $4.00 postpaid. Have an air model for your next National Model Airplane contest. Order today! Be sure and inclose only money orders or drafts.
**R. O. G. RECORD KIT,** everything needed with actual size drawing. Only 65c postpaid.
**BEST RUBBER LUBRICANT KNOWN** used on all latest record models. Doubles winds—Big 7 oz. can, only 35c postpaid.
**SEND 10c AT ONCE FOR A NEW ILLUSTRATED LIST JUST OFF THE PRESS** showing all the latest and best materials as used by recent National contest winners of trips to Europe, etc., with surprising low prices on the best materials. **Schools, Clubs, dealers write for terms. "Model Airplane Experts of Today are the Aviation Experts of Tomorrow."**

**PERU MODEL AIRPLANE SHOP**
PERU, INDIANA

AIR SEAL BALSA WOOD

When you build your own models use Air Seal Balsa.

Cultivated, selected and Kiln Dried. Weight 7 to 11 pounds per cubic foot.

Our Balsa is used in the construction of many of the large commercial planes, also throughout the country by model clubs, schools and colleges. The very best grade of cut sizes may be had in quantities.

We have made a study of model work and can assure entire satisfaction as to quality.

*Write for Free Booklet on Model Construction*

**The Fleischmann Trans. Co.,**

*Balsa Wood Sales Division*

695 Washington St.,
New York, N. Y.

ular attraction in the metal.

Your remarks concerning streamline are perfectly good except that, in the case of the cylinder striking the air, you gave the inference that there was an untouched channel of air at the front of the cylinder. This is wrong, of course, as the whole front of the cylinder strikes the air and also comes within the range of the slip stream from the propeller.

*Dear Sirs:*

*I am a beginner in aviation and I would like to know how to measure the fuselage, according to the wing spread.*

*Respectfully yours,*
HERMAN BROD,
*46 Ft. Washington Ave.*
*New York, N. Y.*

Answer:

It is usually found that the fuselage is two-thirds the length of the wing span and the tail empennage one-third of the wing span. We think that if you adhere to these measurements, you will have no trouble in making your model fly.

—o—

The earth inductor compass was developed by Dr. Paul R. Heyl and Dr. Lyman J. Briggs of the Bureau of Standards at the request of, and with funds furnished by, the Engineering Division, Air Service, United States Army. The application of the earth inductor to the determination of magnetic direction is not new. In magnetic survey work, use is made of both the earth inductor and the dip circle for the determination of magnetic inclination or dip, with results of equal precision.

A number of earlier attempts have been made to use the earth inductor as a compass, but no one of these proposed devices possessed sufficient practicability to bring it into use during the recent war. Maurice M. Titterinton's contribution to the earth inductor compass came as a result of the Pioneer Instrument Company contracting with the U. S. Army, and consisted of certain minor improvements, but he or they cannot under any circumstances claim the originality of the idea. The facts about the earth inductor compass have been misstated on many occassions.

—o—

"Aeronautics" is the general term covering the entire science and art of flight. There are two branches of this broad subject. "Aerostation" is that to which belong craft lighter than air. Under "Aviation" are found craft heavier than air and gasless as to support. Following is a general tabulation of the various kinds of aircraft:

AEROSTATION

Balloon:
- Free—
  - Passenger
  - Pilot or sounding
  - Propaganda
- Captive—
  - Spherical, or other, for taking up passengers
  - Kite, "sausage," "drachen," "saucisse," or other type observation balloon

Airship, a Dirigible Balloon:
- Rigid
- Semirigid
- Nonrigid

AVIATION

Flying Machine—Any gasless, heavier-than-air craft:
- Airplanes, seaplanes—
  - Monoplanes
  - Biplanes
  - Triplanes, etc.
  - Ornithopter—a beating wing machine. None of this type has to date been successful at flight.
  - Helicopter—a direct-lift machine. Only successful experimentally as yet.

## Savoia S-55 Material List

So many inquiries have been received concerning the material needed for the construction of the Savoia S-55, that below is reproduced the full and correct list of material needed.

| | | |
|---|---|---|
| 1 piece | 1/16" x 6" x 40" | balsa for hulls, ribs, motor, formers, etc. |
| 3 strips | 1/8" x 1/4" x 36" | balsa |
| 1 strip | 1/8" x 1/4" x 15" | balsa |
| 1 strip | 1/8" x 1/8" x 36" | balsa |
| 1 strip | 1/8" x 1/8" x 12" | balsa |
| 1 strip | 1/8" x 1/8" x 12" | balsa |
| 5 strips | 11" | bamboo |
| 2 feet | .006 | wire |
| 1 foot | .014 | wire |
| 3 copper | | washers |
| 1 large | | thrust bearing |
| 1 | two ounce bottle | ambroid |
| 1 | one ounce bottle | dope |
| 1 | two ounce bottle | pontoon finisher |
| 1 | two ounce bottle | banana oil |
| 1 block | 1-1/2" x 3/4" x 10-1/4" | pine or spruce propeller |
| 3 sheets | | Japanese tissue |
| 1 package | | model making pins |
| 20 feet | 1/8" flat | rubber |

# Wings for You!

## *Join the*
## American Sky Cadets

The insignia of the American Sky Cadets—illustrated above—identifies the wearer as an air-minded chap who already knows something about the intricate and interesting problems of airplane design and construction and is rapidly learning more. For the American Sky Cadets is the most helpful organization of its kind in existence. If you are air-minded you should become a member and wear the handsome silver wings which every cadet receives free upon joining. And if you are promoted to the commission of Flight Commander or Squadron Commander, as you very likely may be, you can replace the silver wings with the gold wings which will be sent to you with your commission. Read what you get with your membership in addition to the insignia.

## *An Organization of Air-Minded Boys*

The American Sky Cadets conduct City, State and National Contests for airplane model builders. Cups and medals are awarded to successful entrants. Every cadet is elegible to compete.

Free consultation with the Aviation Advisory Board is always available to each cadet. The Advisory Board will answer your questions and help you with construction difficulties.

Each Cadet receives, free, a MOSKITO airplane kit at the beginning of his membership.

Membership entitles you to twelve consecutive issues of MODEL AIRPLANE NEWS, the official magazine, which besides many thrilling stories of adventures in aviation, prints scale plans and other information of special interest to every model builder.

The first issue will arrive shortly after you have received your official membership card and the handsomely colored certificate of membership which is your authority to wear the wings without question.

Here is the opportunity you have been looking for! If you are interested in building and flying model airplanes, if you wish to learn airplane designing, if you wish to grow up to be a leader in this great industry of aviation, become an American Sky Cadet today! Join the leaders. Receive the latest scale plans each month. Accept expert guidance in building your models. Enter them in the official contests open only to American Sky Cadets. Learn the latest things of interest to model builders. Read the best, most thrilling stories about the romantic business of flying that are being published. All of these benefits are yours for less than the price of the magazine alone. Fill out the coupon, enclose $1.50 and mail it to the Administrator, American Sky Cadets, 1926 Broadway, New York City, TODAY!

Dear Administrator:

I want to be an AMERICAN SKY CADET, because I am air-minded! I am enclosing $1.50.

Name..... Age .....

Address..... City..... State.....

When I have obtained 10 more members please make me a Flight Commander and send me my gold wings to replace my silver ones

BUILDING and FLYING
Model Aircraft
The Official Book
A Complete Handbook For all Model Builders and Tournament Contestants

# Build a *Winner!*

## This Official Book . . . shows how

HERE are the facts you have been looking for about model aircraft building: The tools you need, and how to use them—the best materials and where to get them—how to lay out, carve, and balance propellers—how to solder a tight joint—how to make metal parts such as designers use on scientific models—the best way to put on your fabric or paper wing-covering—MONEY-SAVING, RESULT-PRODUCING facts that will enable you to build prize winning models.

**"Building and Flying Model Aircraft"** is the *official book* of the Playground and Recreation Association of America—an association that carries the endorsements of Lindbergh, Wright, Byrd, Henry Ford, Adams, Guggenheim, Amelia Earhart, and many other celebrities. It tells you exactly how to build fifteen different types of model planes, gives you practical instructions on sixteen more, and prepares you to work our *your own* models. There is much valuable information on ornithopters, helicopters, etc.—facts that can start you pioneering into new fields of Aviation research. There are big, useful chapters you can't afford to miss on carrying-cases, repair kits, winders, compressed air motors, accessories, and equipment that professionals use—refinements that often mean the difference between success and failure.

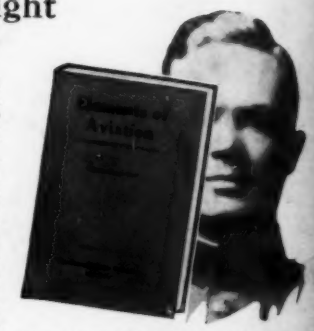
300 pages and 198 big illustrations make this one of the most valuable model books that any builder can have. The author is a member of the staff of the U. S. National Museum, the famous Smithsonian Institute, and Model Editor of the nationally-known U. S. Air Services Magazine. Long and successful experience with models qualifies him to write an *authoritative* book. This is one of the famous Ronald Aeronautical Books—a series of practical aviation manuals written by the most famous experts in the world. Ronald books are standard in flying schools, airports, and factories all over the world. Designers of big transport planes rely on them for accurate information. *You* can rely on "Building and Flying Model Aircraft" for practical, result-proved facts about models.

If you are looking for success with your planes, and hope to make a showing in the races this spring, don't cut another piece of balsa, or bend another stick of bamboo until you have this useful builder's manual right at your elbow. Send for your copy today, and see just how thorough and practical it is.

### Send No Money

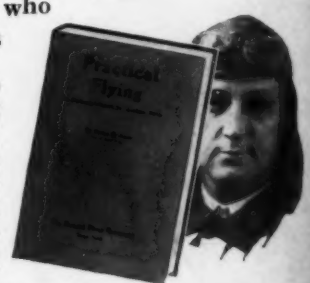
If you prefer, we will send "Building and Flying Model Aircraft" to you on approval. Simply pay the postman $2.45 when he brings your copy, and if at the end of five days you are not thoroughly satisfied, you can return the book and get your money back.

## Principles of Flight and Design



If you want to build models from your own designs, *"Elements of Aviation" by Colonel V. E. Clark* will help you immensely. Most of the successful airplanes in the United States use wings designed by him, among them being Colonel Lindbergh's famous "Spirit of St. Louis", the Vought Corsair, the Navy PN-10, the Wright "Apache" (all these holding world's records), and many other planes both here and in Europe. Colonel Clark's success may be attributed to his thorough understanding of the "why" of flying—his ability to apply *simple mechanical principles* to the design of airplanes. In this book he gives you his valuable understanding of construction and flight in language so simple that you cannot go wrong. He explains air and airfoils, airfoils and airflow, stability and control, propeller effects, accelerated flight, the earth's atmosphere and the effects of altitude, parts of an airplane, weights and dimensions of all parts, and much more. 24 illustrations make everything clear. Information like this enables you to *understand* what you are doing when you design a new racer or endurance model. Postpaid $3.00.

## A Practical Course of Instruction for those who want to be Pilots



Your first move if you want to be a flyer is to read this important manual—*"Practical Flying"—by Major B. Q. Jones.* No one is better qualified to teach you the tricks of safe and successful piloting—no one is better equipped to answer your many questions about the possibilities and opportunities in Aviation than the author of this book. He is famous as the safest trainer of pilots in *any* army—he is renowned as the first American to deliberately spin his ship to see how to recover. In this book he shows you how to perform all kinds of manoeuvers, from the simplest to the most difficult; take-off, climb, glide, landing, climbing turns, Immelmanns, chandelles, figures of eight, how to avoid stalls and spins—how by remembering a few simple principles you can get out of them when necessary. He shows you how to judge speed and distance, how to tell whether you have a margin of safety or not. He explains the use of flying instruments and engine instruments. In simple question and answer form he gives you invaluable flying facts that will save your time and money, and help you to get the most from your hours in the cockpit. Postpaid, $3.00.

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